73® Amateur Radio Today

FEBRUARY 2002
ISSUE #495
USA $3.95
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Projects:
- "J" Antenna for HTs
- Another Darn Keyer
- Lamps from Tubes
- QSLs

Restore:
- Pierson KE-93 Rcvr
- Navy Op Station

Sat Tracking for Kids

QRP
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Your Own
Owner's Manual?

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- DM-340 MVT regulated power supply

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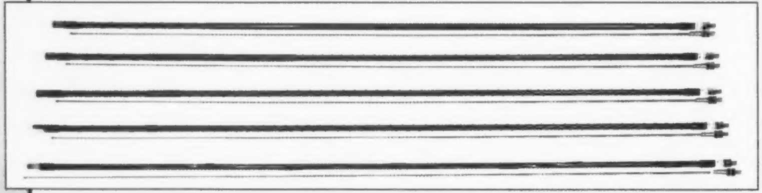

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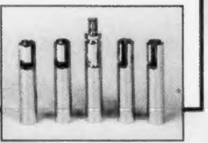

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www.waynegreen.com

COVER: Dan Smith K4BES, Birmingham AL, sent in this shot of his 2001 Field Day site. What you don't see are his two 3-foot balloons above at 300 feet. Attached to 150-lb. construction cord, they supported a 65-ft. W3EDP antenna made of #26 wire.

THE TEAM

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73 Amateur Radio Today Magazine
70 Hancock Rd.
Peterborough NH 03458-1107
603-924-0058
Fax: 603-924-8613

Reprints: $3 per article
Back issues: $5 each

Printed in the USA

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QRX . .

Fat Birds Fly Better

About twice a year, we bring you stories about radio tagged migratory birds. In most cases, it's those ever-elusive burrowing owls. Now we have a totally different kind of bird story. It still involves radio tracking, but this time to see if bigger birds or smaller birds have a better chance to survive in flight.

European scientists have discovered what seems like a contradiction about migrating birds. They found that the fatter the bird, the more efficiently it appears to fly.

Researchers at Lund University in Sweden have studied several small species including the Red Knot. In our hemisphere, these 20-ounce wading shorebirds travel 18,000 miles every year, to the tip of South America and back to the Arctic. On the way north, they stop on the shores of New Jersey to feast on the eggs of horseshoe crabs, to build up energy for the last 2,000 miles of their northward trip, which they make nonstop. On these binges, the Red Knots can double their normal body weight.

Continued on page 6

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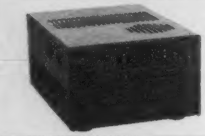
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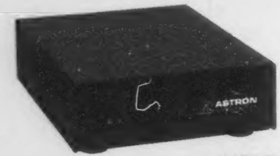

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SS-12	10	12	1⅜ x 6 x 9	3.4
SS-18	15	18	1⅜ x 6 x 9	3.6
SS-25	20	25	2⅞ x 7 x 9⅜	4.2
SS-30	25	30	3¾ x 7 x 9⅝	5.0

MODEL SS-25M

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MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SS-25M*	20	25	2⅞ x 7 x 9⅜	4.2
SS-30M*	25	30	3¾ x 7 x 9⅝	5.0

MODEL SRM-30

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MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
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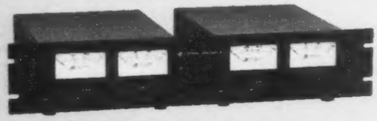
SRM-30	25	30	3½ x 19 x 9⅝	7.0

WITH SEPARATE VOLT & AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25M	20	25	3½ x 19 x 9⅜	6.5
SRM-30M	25	30	3½ x 19 x 9⅝	7.0


MODEL SRM-30M-2

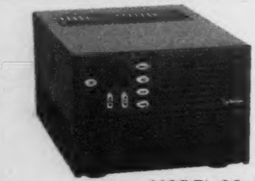
2 ea SWITCHING POWER SUPPLIES ON ONE RACK PANEL

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25-2	20	25	3½ x 19 x 9⅜	10.5
SRM-30-2	25	30	3½ x 19 x 9⅝	11.0

WITH SEPARATE VOLT & AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25M-2	20	25	3½ x 19 x 9⅜	10.5
SRM-30M-2	25	30	3½ x 19 x 9⅝	11.0

MODEL SS-12SM/GTX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GE MARC SERIES
GE MONOGRAM SERIES & MAXON SM-4000 SERIES
ICOM IC-F11020 & IC-F2020
KENWOOD TK760, 762, 840, 860, 940, 941
KENWOOD TK760H, 762H
MOTOROLA LOW POWER SM50, SM120, & GTX
MOTOROLA HIGH POWER SM50, SM120, & GTX
MOTOROLA RADIUS & GM 300
MOTOROLA RADIUS & GM 300
MOTOROLA RADIUS & GM 300
UNIDEN SMH1525, SMU4525
VERTEX — FTL-1011, FT-1011, FT-2011, FT-7011

NEW SWITCHING MODELS

SS-10GX, SS-12GX
SS-18GX
SS-12EFJ
SS-18EFJ
SS-10-EFJ-98, SS-12-EFJ-98, SS-18-EFJ-98
SS-12MC
SS-10MG, SS-12MG
SS-101F, SS-121F
SS-10TK
SS-12TK OR SS-18TK
SS-10SM/GTX
SS-10SM/GTX, SS-12SM/GTX, SS-18SM/GTX
SS-10RA
SS-12RA
SS-18RA
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SS-10V, SS-12V, SS-18V

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PX1	**35W Professional FM Stereo Transmitter**	**$1,795.95**

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NEW!

- ✓ New-built-in RJ11 phone jack
- ✓ Large memory holds over 500 numbers
- ✓ Big bold 8 digit display, auto insertion of dashes
- ✓ New-output latch jack

Dialed phone numbers on the radio, repeater codes, control codes, anywhere touch-tones are used, you can read and store them! All new design for 2002. Capture those tones with the TG2!

TG2	**Tone Grabber Tone Reader Kit**	**$59.95**
CTG2	**Matching Case & Knob Set**	**$14.95**
AC125	**110 VAC Power Adapter**	**$9.95**

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NEW!

- ✓ Visible and audible display of your heart rhythm
- ✓ Re-usable sensors included; just like visiting the hospital!
- ✓ Bright LED "beat" indicator
- ✓ Monitor output for oscilloscope display

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ECG1	**Electrocardiogram Heart Monitor Kit**	**$34.95**
CECG	**Matching Case & Knob Set**	**$14.95**
AC125	**110 VAC Power Adapter**	**$9.95**
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FM100	**Super-Pro FM Stereo Radio Station Kit**	**$249.95**
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NEW!

- ✓ All new design & features for 2002!
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FM25B	**Synthesized FM Stereo Transmitter Kit**	**$129.95**

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NEW!

- ✓ Color during the day, IR B&W at night!
- ✓ Automatically turns on IR illumination!
- ✓ Waterproof to IP57 standards!
- ✓ Black anodized housing with universal mount

Best of both worlds! This video camera is a waterproof COLOR camera during the day. When the light level drops, it automatically changes to B&W and turns on its built-in IR illumination, with 10 IR LEDs. Powered by 12VDC and terminated with a professional BNC connector. B&W only model also available if color is not needed. Both in heavy anodized black housing.

CCD309	**Color/B&W IR Waterproof Bullet Camera**	**$169.95**
CCD308	**B&W IR Waterproof Bullet Camera**	**$109.95**
AC125	**110 VAC Power Adapter**	**$9.95**

MINI B&W CAMERA WITH IR ILLUMINATION

NEW!

- ✓ Built in IR illumination!
- ✓ Sees in total darkness!

What a deal! This miniature B&W video camera has 6 high power IR LEDs built into it to provide illumination in total darkness! No need for external IR illuminators. Attractive black aluminum housing easily mounts at any angle with the built-in swivel bracket. Runs on 12VDC, and includes professional BNC output plug-in harness.

CCD303	**Mini B&W IR Illuminated Camera**	**$59.95**
AC125	**110 VAC Power Adapter**	**$9.95**

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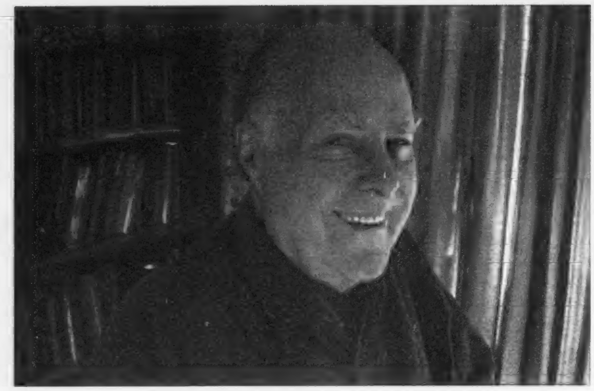

Wise Up & Beat the Odds

NEVER SAY DIE

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Hey, ARRL, Wake Up!

My reaction to the 9/11 attack was that this was just the beginning. As I've been writing for a couple of years, it's just too easy to use germs such as anthrax to wipe out millions of people. Now we learn that the worst virus yet, ebola, has been aerosolized by scientists, who since seem to have recently either disappeared or met untimely ends, and is in terrorists hands. Great.

Since our government seems to be busier covering things up than dealing with new threats, we don't have any national communications backup system in case the power goes off. Except us, and we've been taking our cue from Ethelred the Unready, aka Newington in this incarnation.

I have to admit as to not being totally surprised at my not getting letters or photos from ham clubs about their efforts to set up emergency communications systems or to try to activate the inactive hams in their area.

Conspiracy Mongers

I'd try harder to ignore conspiracy theorists if history hasn't proven them right so often. In the WTC case, one of my readers called to say that it was a smart move to ground all commercial flights immediately after the attack. He said box-cutters were found hidden in the seats of 21 of the grounded flights. Then I got E-mails asking why the FAA didn't respond immediately when the flights changed course and stopped communicating. And how come in these days of packed planes, these particular flights had so few passengers?

Cover-ups?

Thanks to the persistence of Robert Stinnett *(Day of Deceit)* we now know that the conspiracy nuts of sixty years ago were right. Roosevelt really did plan the Pearl Harbor attack. If you can find a copy of Fred Goerner's *The Search for Amelia Earhart* (1966) in your local library you'll find out about the huge government cover-up in her case.

Anyone who has been so isolated from facts that they believe the government isn't covering up on UFOs needs to get a copy of Col. Corso's *The Day After Roswell.*

The Anthrax Scare

If you read *The New Yorker* you know that the anthrax deaths have been caused by a weaponized variety of anthrax which started with a dead cow in Ames, Iowa. It has a lot of folks afraid to open their mail, but it seems unlikely that it has been spread by any foreign terrorists.

On Saturday evening, November second, I was invited to be a guest on the Coast-to-Coast AM radio show, with Barbara Simpson as the host. This show is carried by over 500 stations nightly and has a huge audience, despite its weird time slot from 1 to 6 a.m. Eastern time.

One of the first questions that came up was how we can deal with bioterrorism. I pointed out that the best defense is to be very, very healthy. In even the worst plagues there have been people who didn't get sick, and others who survived the sickness while others were dying by the thousands.

Healthy? According to the Department of Health about 1.5% of Americans are truly healthy.

The details on how anyone can recover from any illness and be totally healthy are in my *Secret Guide to Health.* The secret is simple, as I've been trying to hammer into your consciousness: Stop poisoning your body. My book discusses the poisons.

However, I explained, until you achieved health, you're going to want to have some damned good antibiotic on hand. Lots of it. And, waiting until people around you are dropping is not the time to queue up at your doctor's waiting room to get a prescription. Of course, hoping that what you get, if the drug store hasn't run out, hasn't been compromised by the pathogen (as most have).

The answer, of course, is silver colloid, which no germ or virus has been able to survive. And fortunately, this is ridiculously inexpensive, even if you buy it at a health food store. But the cheapest way is to make it yourself. You can dig out the 1997 *73* article by Tom Miller on the history of this ancient antibiotic, how to make it, and how to use it. Then you need a source of 99.999 pure silver wire (five nines in the trade). See the Radio Bookshop ad in page 63 for an inexpensive source of the silver, a little kit of the battery and alligator clips, and a reprint of Miller's article. The three items are $25.

The result of my talking about this was a deluge of orders via my Web site [www.waynegreen.com], by fax, telephone, and bushels of mail orders for both my health guide and the silver colloid making kit. Whew!

I also explained how the blood purifier could help by cleaning any virus or germ out of the blood, generating orders for the *Blood Purifier Handbook* and a big demand for Plant Growth Stimulators.

Naturally I went into the big need there would be for amateur radio for emergency communications, and that resulted in our getting hundreds of new subscribers.

Ramifications

The people I've talked with were mainly worried about surviving a bioterrorism attack. Few had considered anything beyond their and their families' immediate survival. But, if there is a serious bio attack, it could kill millions of the unprepared and that would bring the country to a halt. Without railroads the power grid would shut down. Without daily truck deliveries there would be no food or fuel. How prepared are we for that? Echoes of Y2K.

Should we gamble that this scenario is so preposterous

Continued on page 8

Big Savings on Radio Scanners

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The Bearcat 780XLT has 500 channels and the widest frequency coverage of any Bearcat scanner ever. Packed with features such as Trunktracker III to cover EDACS, Motorola and EF Johnson systems, control channel only mode to allow you to automatically trunk certain systems by simply programming the control channel, S.A.M.E. weather alert, full-frequency display & backlit controls, built-in CTCSS/DCS to assign analog and digital subaudible tone codes to a specific frequency in memory, PC Control with RS232 port, Beep Alert, Record function, VFO control, menu-driven design, total channel control and much more. Our CEI package deal includes telescopic antenna, AC adapter, cigarette ligher cord, DC cord, mobile mounting bracket with screws, owner's manual, trunking frequency guide and one-year limited Uniden factory warranty. For maximum scanning enjoyment, order magnetic mount antenna part number ANTMMBNC for $29.95; The BC780XLT comes with AC adapter, telescopic antenna, owner's manual and one year limited Uniden warranty. Not compatible with AGEIS, ASTRO or ESAS systems. For fastest delivery, order on-line at www.usascan.com.

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Uniden BEARCAT 895XLT
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AOR AR16BQ Wide Band scanner with quick charger	$209.95
ICOM ICR8500 wideband communications receiver	$1,469.95
ICOM PCR1000 computer communications receiver	$379.95
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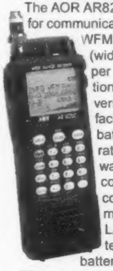

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continued from page 1

Over the past few years a number of European Red Knots were radio tagged and tracked by the Swedes as they prepared for a similar trip between the British Isles and the Russian Arctic. The study indicates that building up of fat deposits to be burned as fuel during the migration is more than worth the energy that it takes to carry the additional weight. The heavier birds apparently use their muscles more efficiently. Just why this is so remains a mystery. Even stranger is that the results seem to "fly in the face" of a central theory of aerodynamics — no pun intended of course.

So what does this have to do with ham radio? Well, it points out that research always seems to yield unexpected results, and it gives us a chance to remind you that dozens of ham operators in western states were listening for the VHF radio tags on endangered Burrowing Owls this winter. You could help out, too, next time. Find out how by visiting [www.homingin.com]. Who knows, maybe a ham will make a similar startling discovery about the migration habits of these unique critters. That's homingin — one word — for the Web site: [homingin.com].

All of this really does go to show that the more mankind uses science to discover the secrets of Mother Nature, the more amazed man is at what he learns.

Thanks to Joe Moell K0OV ("send no jokes about birdbrains, please") and Ecology Today, *via* Newsline, *Bill Pasternak WA6ITF.*

Hamvention 2002: Forums Schedule Announced

If you are thinking about attending the 2002 Dayton Hamvention, then go to its Web site and click on the Forums area. Forums Chairman Jim Ebner N8JE says that the initial schedule for May's Dayton Hamvention group discussion sessions is now on-line.

As previously announced, the theme of the 2002 Hamvention is Emergency Communications. In keeping with the theme, some of the highlights include Gordon West WB6NOA explaining how to use the Global Positioning System. Gordo will also show how it offers hams the ability to know where they are and describe where they are to better than a foot. That's very important information to have on hand when working an emergency situation.

But that's not all. Also on hand will be John McHugh KU4GY, the Coordinator for Amateur Radio National Hurricane Center, W4EHW. McHugh will show the volunteer public service work of the gang at W4EHW, and the inside workings of the National Hurricane Center in Miami.

KU4GY will also detail two exciting projects called CARMEN and CWOP that they are working on in conjunction with NOAA. What are they? You will have to attend his session at Hamvention 2002 to find out.

Vermont's Mitch Stern W1SJ, will also be there to talk on techniques used by the best operators involved in emergency communications. This session will also include information on the proper way to communicate during emergencies. Also hosting a session will be Mid-Cars on the importance of mobile-to-mobile and mobile-to-base communications during emergency times.

Amateur Radio Newsline will also be there once again hosting the Live Town Hall Meeting. Bill Pasternak WA6ITF, will moderate a session on Ham Radio Emergency Communications in the 21st Century titled "Looking to Apply What We Have Learned from the Past."

And also look for other popular sessions, including Carole Perry's Youth Forum and Joe Eisenberg K0NEB with the latest in kits and how to build them.

Want to know more? The latest information on Hamvention 2002 is always on the Web at [www.hamvention.org].

Thanks to DARA and Don Wilbanks KC5MFA, via Newsline, *Bill Pasternak WA6ITF, editor.*

America at War: FCC Gettysburg Changes Mail Address

At least for package deliveries, the FCC's Gettysburg, PA, office has announced that it has moved its mail handling facilities off-site.

The reason is the same as reported for the FCC in Washington — simply a precaution in case some of the strange people we all call terrorists decide to target the Gettysburg licensing facility.

It's all fairly simple. Effective immediately, all overnight couriers, United Parcel Service, and Federal Express deliveries have to go to a new location. That address is the FCC Gettysburg, Rear Entrance, 35 York Street, Gettysburg PA 17325.

The change does not affect US Postal Service deliveries. At least not yet. They will continue to be accepted at the office's physical address on Fairfield Road and diverted to the off-site mailroom.

Thanks to the FCC, via Newsline, *Bill Pasternak WA6ITF, editor.*

National Antenna/Tower Consortium Formed

Members of a newly formed "Antenna/Tower Consortium" made their debut at Shorecliff Communications' 2001 Tower Summit. The Consortium was formed to promote a consistent and fair national antenna policy.

After a year of preliminary work, the National Antenna/Tower Consortium was incorporated in Washington DC and members made their first public appearance October 29th, at the Tower Summit in Las Vegas.

The National Consortium was formed as a response to increasing difficulties antenna and tower users, whether broadcast, public safety, cellular, radio-common-carrier, private radio, two-way, amateur, or others face in siting, constructing, and modifying antenna systems.

Member Barry Umansky described the current situation as "a patchwork of inconsistent and sometimes irrational local regulations that result in a slow and expensive approval process and needless litigation." Fred Baumgartner explained that the goal of the Consortium "is to bring together antenna users to develop a fair and reasonable set of guidelines for antenna regulation, with the intention of advocating adoption of a national set of standards."

The pair explained that they "believe an FCC license should bring with it some assurance that the licensee can actually build, modify, and operate the radio facility." They noted that Digital Television, cellular, and routine expansion of existing facilities are being held hostage to a growing number of antenna restrictions based largely on aesthetic concerns. They pointed out that antenna regulations and bans are fast becoming a national epidemic.

Unlike public policy decisions that are based on safety, security, or as part of an overall planning process that balances conflicting objectives, antenna regulations too often appear to be based exclusively on vague aesthetic concerns unsupported by hard evidence, the Consortium members explained. The Consortium also believes that policies that would encourage co-location, antenna reuse, aesthetic design, and other accommodations should be part of an overall set of national standards.

The Consortium is in the process of recruiting and serving members representing a wide array of communications technologies and companies. The new organization is raising public and industry awareness, attracting funds and other contributions to support the enterprise, and soliciting volunteer assistance needed to make the organization an effective voice. Mr. Umansky noted that "anyone who has ever fought an antenna battle will tell you that there is something dreadfully wrong with the way the process works. It now is time to get groups with different agendas to work together for the success and advancement of over-the-air communications."

The Consortium can be contacted at [antennatowers@hotmail.com], and maintains a Web site at [www.antennatowers.tvheaven.com].

Thanks to Fred Baumgartner, Parker CO.

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Tune In the Universe

Tune In the Universe is a new book on CD-ROM by SETI League Director H. Paul Shuch N6TX. The book is unique both in that it is interactive with the reader and because it can be read using any Web browser. No special reader software is required.

Why a book now? N6TX says that it's kind of overdue:

Shuch: "I've been on the lecture circuit for SETI for the past seven years, and everywhere I go people ask if I have a book about all of this. Well, we have a Web site but not everybody has an Internet connection and some other people's download speeds are a bit slow. So I took the best material from seven years of running the SETI League and tried to put it together in one convenient place."

And that's exactly what Dr. Shuch has done. Called a ham radio operators' guide to the search for extraterrestrial intelligence, the book is divided into six sections that cover every aspect of ham radio's involvement in SETI as well as the ongoing search itself. Also included are a mix of photos and even some songs that Dr. Shuch says should educate as well as entertain. Why music you ask? N6TX says that it's a fun way to learn about anything:

Shuch: "As any teacher knows, memory is enhanced and multiple learning styles are accommodated by invoking as many different sensory pathways as possible. That is, we educators try to stimulate the students auditory, visual, and tactile systems all at once to maximize the learning experience. Why do you think we are always writing on a chalkboard and asking you to take notes while we drone on in a monotone?

"Somewhere along the line in my teaching career I figured out that music was another sensory pathway worth stimulating. And, just maybe would make my lectures a tad less monotonous. So I began introducing songs as learning aids."

Tune In the Universe is published by the American Radio Relay League and is priced at under $25. For more information visit the League's Web site at [www.arrl.org]. More about the SETI League is also to be found in cyberspace. It's at [www.setileague.org].

Thanks to N6TX and the SETI League, via Newsline, *Bill Pasternak WA6ITF, editor.* 73

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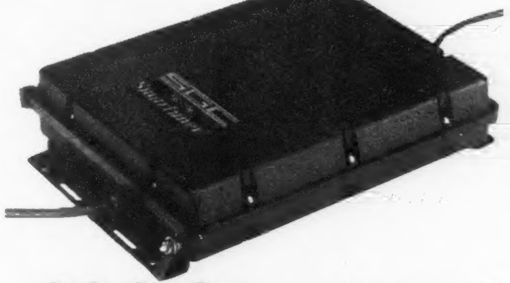

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NEVER SAY DIE

continued from page 4

that there's no need for us to organize an amateur radio emergency system? Are you comfortable with waiting until something happens and then hoping that we can somehow get organized?

If you've read Duncan Long's *Bioterrorism* (see the review on page 34 of my *Wisdom Guide*) you know how easy and inexpensive it would be for an enemy to kill a hundred million or more Americans within a few days with today's bioweapons. And you know that the terrorists have been taking flying lessons and checking on crop-spraying planes.

If you've been following the testimony of bio experts in the media you know this is a lot more than an exercise in media gloom and dooming.

Are you set up to make silver colloid? Have you bought or built a blood purifier yet? I've published the circuits for both. What plans have you and your local ham club made to provide emergency communications for your town?

Lying

I keep trying to get you to tape the Art Bell show (Coast-to-Coast AM) every night, so you won't miss it when Art has some outstanding guests. Yeah, I know, a lot of the time it's like reading the *National Enquirer,* but now and then he has guests which make the effort worthwhile.

Steven Greer and some other recent guests who have thoroughly researched the UFO-ET situation recently held a national press conference, complete with the testimony from some very high military and government officials, explaining how the secret government behind our government has been covering up the reality of UFOs and ETs. Did you read about it in the papers or hear about it on the TV news? You bet you didn't.

The many leaks about the Roswell crash, along with the often ridiculous military efforts to cover it up, fueled the urgency for independent investigation. The endlessly blacked-out papers from government agencies responding to Freedom of Information requests on the subject have not inspired confidence.

Art Bell has aired several interviews with people who claim they've seen salvaged UFOs at the Area 51 base in Nevada, and their stories were consistent and credible. Then there was Col. Corso's book, *The Day After Roswell,* which claimed he was the man in the Pentagon who facilitated alien technology recovered from UFO crashes being used by industry to help them develop transistors, printed circuits, lasers, night vision, and other new technologies. Corso died soon after the book was published, and his son is convinced that his father was murdered to shut him up.

The main concern is that the military, along with pressure from contractors, are getting Congress to fund more star wars developments. The purpose of these is not to protect us from Saddam or North Korea, or even from what's left of Russia, but to be able to combat the ETs.

Government reports so far uncovered make it clear that our military are well aware that we are being, and have been, visited by several ET groups. These visits stepped up significantly when we went nuclear in 1945. That seems to have rung a galactic alarm bell.

The ETs are so far ahead of us technologically that they could, at any time, stomp us out. But, they seem more interested in monitoring our activity and, perhaps, helping in some subtle ways to guide us.

So, why are the military thinking in terms of attacking ETs? That's an easy one.

If you know anything at all about the military — or government — or even big business, you know that the only way to get ahead is to not cause trouble. Report for work, look like you're busy, file the required reports, and wait for seniority to move you up the ranks. Thus, our generals and admirals got to their places on the Joint Chiefs of Staff by never having any creative ideas which might get them in trouble.

As the Admiral of the Queen's Navy put it in *Pinafore,* "I polished up the handles so carefully, that now I'm the ruler of the Queen's Navy." Queen Elizabeth was not amused.

It was this mass stupidity at the Joint Chiefs level that made such a mess of our war in Vietnam. And Somalia. And Haiti. And Kosovo.

I had a close brush with Admiral Bruton, who was in charge of our forces in Europe. It's been a while since I've told that story — I'll have to do it again. It's a great story. What a jerk he was!

All it takes to tape the Coast-to-Coast AM show is a radio and VCR. You plug a cable into the radio's earphone jack, and the other end into the AUDIO IN jack on a VCR. Then you program it to tape the audio (LINE). The show is on from 1–6 a.m. here in the East, and it comes in on about 20 stations up and down the dial.

I listen to the show while I'm fixing and eating meals, fast-forwarding through the prostate commercials and news, and also any time wasted on listener call-ins before the guests come on, usually in the 2nd hour of the show.

Since there are so many electrically challenged people, I've put together a little VCR taping kit which I've been selling for $5, complete with programming instructions. It's a good seller. It's in my catalog as item #83.

Yes, the UFOs are real. Yes, ETs are here and have been, possibly for thousands of years. Yes, they communicate by telepathy. And yes, they may well be influencing what we're doing. No, there's no indication that they mean us harm. The consensus is that they've been watching us develop, perhaps nudging us now and then, and that eventually, when and if we grow up, they will be welcoming us to some sort of galactic federation.

If all this is unreal to you, it means that you haven't bothered to read much that's been written by some outstanding researchers. My $5 *Secret Guide to Wisdom* reviews several books which will help you come up to speed.

College? No, Thanks!

You know, I haven't had one critical letter about my claim that college is a huge waste of time and money as far as being successful in life is concerned.

Rudi Mangold HB9BU kindly sent me a six-page article from *Forbes* (12/28/98) which backs me up.

Yes, there are a few career paths for which a sheepskin is mandatory — architects, pharmacists, elementary school teachers, lawyers, doctors, and physical therapists. Around 30% of the workforce requires a college degree.

In the main, a college degree will help get you a job with a large corporation or the government. If all you aspire to is a job with a large corporation or the government, you'll never be more than a small cog in the wheel, never a wheel. Well, make that a spoke these days.

I'm urging you to shoot higher in life. To be successful. To contribute to making life better for others. To help move civilization ahead a little.

The *Forbes* article points out that the figures showing that college grads make more money than high school grads is a distortion of reality. They showed that real estate brokers (no degree) average more than double the pay of grads with biology, social sciences, liberal arts, education, and home economics degrees.

My recommendation is to learn to be an entrepreneur — to own your own business. Here, the extra four years of noncollege education gives you a huge advantage over grads.

If it's a little late for you to

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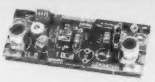

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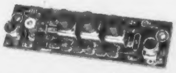

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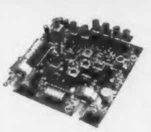

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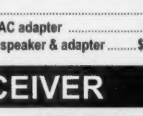

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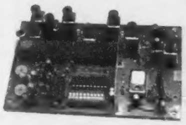

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Kit (ham bands only) (TCXO option $40)	$109
Wired/tested, incl TCXO	$189

T304 Synthesized UHF Exciter: for various bands 400-470 MHz.

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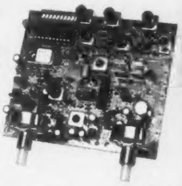

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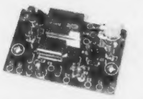

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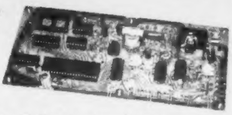

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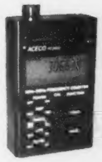

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Weather Sat Tracking is Awesome!

Real science means real fun for 8- to 12-year-olds!

In January 1993, I happily retired from work as an engineer in the telecommunications industry. I was soon surprised that I missed the social side of work. I missed the day-to-day contact with people who understood what I did, the technical conversations, and (although I hate to admit it) some of the meetings. I also found that I had few local friends, since my work had really prevented me from being an active part of my community.

Here in Australia, or at least in Sydney, our primary (elementary) schools are small and locally based. Support from the parents is encouraged, with Moms mainly helping out with reading, music, school sports, canteen, and the like. Few dads are available during the day, and when they retire, primary school kids are far down their list.

Some months after I retired, I found myself at my local primary school's orientation meeting (presented mainly for the parents of new incoming students), and heard the usual appeal for help from the principal. After the meeting, I cornered the principal, told him I was a retired engineer, and asked him if he would like for me to "donate" a hands-on science program for his school. He agreed, but I could tell he had heard it all before and expected me to appear maybe a couple of times and then fade away. Little did we know at the time that in the following years I would help give the same talk to parents, and would actually outlast the principal and attend his retirement party!

The school was for grades K through 6, had an enrollment of about 115 students, and had a staff of 5 teachers. The setting was in a semirural environment with small market gardens or hobby farms surrounding the area, and most important, was only about 3 minutes from home, so I could duck in and out. The principal was a teaching principal in addition to his administrative

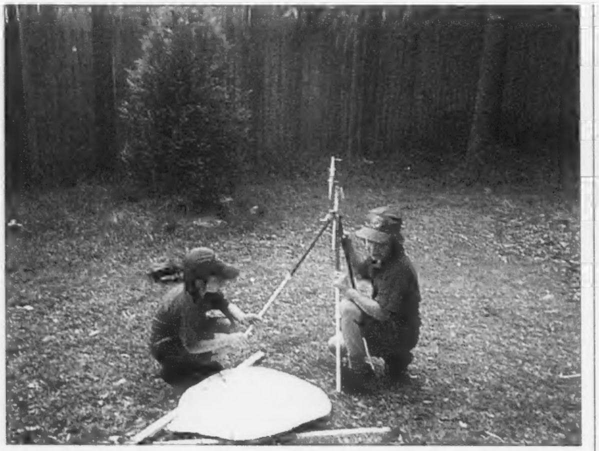
Photo A. *Julian and Daniel orienting and setting up the antenna pedestal.*

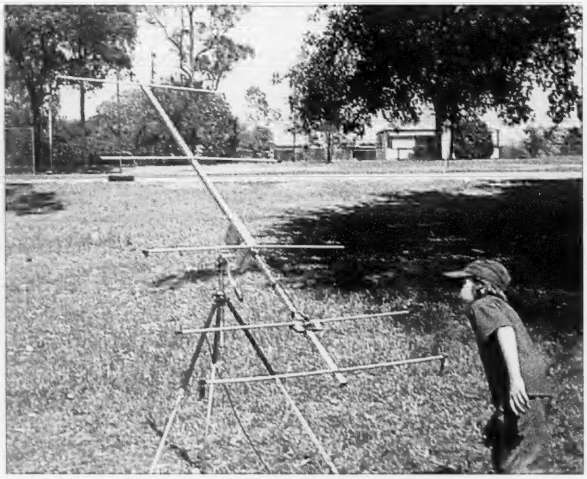
Photo B. *Julian aligns the antenna for the next pass.*

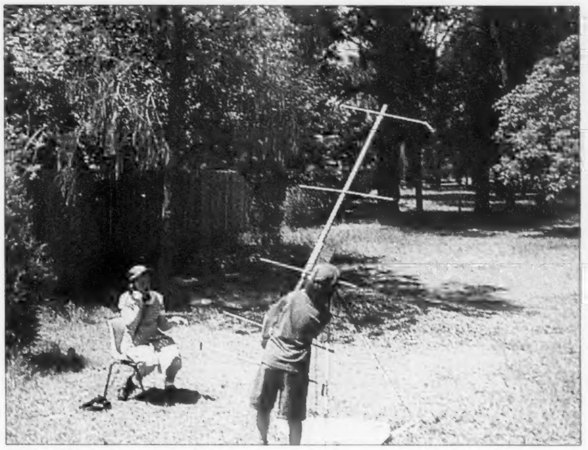

***Photo C.** Olivia and Julian on a high elevation pass — it's going right overhead!*

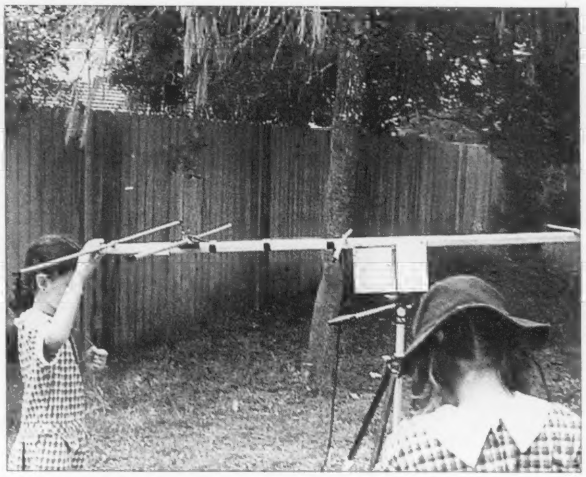

***Photo D.** Inclinometer for setting elevation angles during track.*

workload, which made him really appreciate any assistance or relief from the same old routine. The overall "mission" was to expose the students to as many areas of science and technology as I could — such as chemistry, electricity, some electronics, computing history, binary math, computer programming (QBASIC), current theories on the origin of the universe, our solar system, space mechanics, and accident prevention and analysis. (Hidden agenda: Showcase various technical career paths!)

The big project for the school year was satellite tracking!

Early on in the year, I announced that later we would be playing with a few billion dollars' worth of toys in earth orbit. I explained that what we would be doing is probably at the university level and certainly no other primary schools in Australia would be doing live satellite tracking. I emphasized that this project would NOT be a demonstration. *They* would be trained, and *they* would do it, not me. They would be expected to "walk the walk and talk the talk." (Hidden agenda: Take the students well outside the primary school envelope.)

As an absolute minimum, two lecture sessions are needed to prepare the class. It is extremely useful, however, to present a number of other science sessions to build credentials and get to know the students and teachers. These two essential sessions are a nonmath version of orbital mechanics and a session on space industry jargon. It is explained that jargon is a shorthand way of speaking so as to minimize communication time and the possibility of misunderstanding. Typical items would be AOS, LOS, rise time, look angles, AZ, EL, apogee. The students were also drilled on compass directions and how to minimize confusion by saying AZ/EL in a standard way with individual numbers for direction (two three nine) and words for elevation (up

***Photo E.** Kate and Janel doing a difficult overhead azimuth reversal.*

***Photo F.** Kiara and Janel concentrating on a good track in progress.*

Photo G. *Janel tracking while using live telephone data from the acquisition crew.*

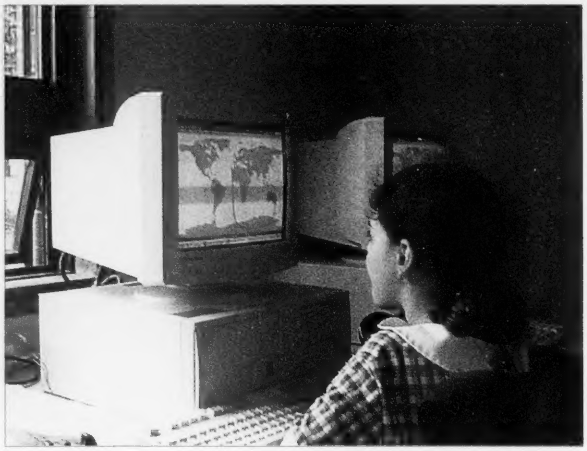

Photo H. *Kiara on the telephone link, passing WINTRACK pointing data to the antenna crew.*

twenty-two). Handouts of all lectures are prepared in advance and passed out after each session. This in itself is unusual, with the students treated as adults, complete with printed review notes. Well-prepared handouts also tend to underline that this project is really special and important.

There are a number of other things that should be done in advance to prepare for the satellite tracking exercise. Antenna construction is the first subproject. This should be started early because of the time it always seems to take. The students can do this any way they like, individually or as teams, as long as the antennas are electrically sound, essentially correct in the dimensions, and we get a few antennas. It is primarily a recycling project where the students are given detailed measurements to construct a three- or five-element yagi antenna for 137 MHz (or 146 MHz in the earlier years). The intention is to use as many of the "good" antennas as possible. When the antennas finally appear, they are prepared with a tail of coax and drilled so that they can be easily swapped on and off the antenna mount. It is also wise to put Styrofoam, corks, or tape on the ends of the elements to avoid any eye damage. They are then tested at school by ear against a local Morse practice beacon, or some other stable signal, to roughly check gain and directional characteristics. One of our best-performing antennas also takes the prize as the ugliest — split and cracked bamboo with fencing wire taped to the bamboo as elements. (Hidden agenda: Recycle.)

While all this is going on, the students are being assessed to identify the best and most interested. They will be selected as the team leaders or "pass controllers." The pass controller will be in charge of a team and will determine the pass times, downlink frequencies, and look angles in advance, supervise the daily equipment setup and breakdown, run the pass, and be prepared, during a live pass, to take over any other student's job if necessary. It is sometimes surprising as to who the pass controllers turn out to be. They are not always the best students, but can be kids with reading problems, classroom clowns, or other unlikely choices. In any case, being a controller has status, and in some cases can be a child's first real success. (Hidden agenda: New opportunity to succeed.)

Photo I. *Catherine and backup, Kate, at AOS on MET 3-5.*

Photo J. *Catherine with WXSAT video output of a large low pressure area.*

The first few years, objects tracked were various Oscars, and *MIR*. A number of contacts were made with *MIR* on their packet BBS. Although it was in the "gee whiz" category, I am not sure the students always understood the significance of uploading a packet message to the *MIR* BBS and downloading it on the next rev along with any rare replies. We gave up on the RS series after 10 meter RF in the computer room zapped a modem in one computer and also damaged the motherboard in another. Next time, we will have a proper ground system. I seem to remember the damage was blamed on lightning over the Easter school break. Three years ago, we migrated to the 137 MHz weather sats, using WinOrbit and WXSAT software, both free over the Internet.

The equipment used for the last couple of years has been: a scanner (Uniden UBC9000XLT); WinOrbit and WXSAT software; a panning and tilting camera tripod tied to a triangular frame placed on the ground to prevent movement; a large cardboard circle about 2 or so feet in diameter, with compass directions heavily marked every few degrees; a home-made inclinometer to measure elevation; a quick mount on top with wing nuts so that antennas can be swapped easily; and a pocket compass to set up true north against magnetic north. Last but not least is a communication system to get pointing information from the acquisition and tracking computer to the antenna crew. Handhelds could be used, but we have always used some sort of telephone system. The easiest is two old telephones connected by a bit of twisted pair with an additional headphone jack at the antenna end. This is powered by four D cells in series with the line. Phones are best, as the students like to play with them but disconnect when hung up between passes. This could be another subproject in itself, and handled in a similar way as antenna construction.

The inclinometer is basically a heavy pointer mounted on a home-made scale of degrees elevation. As the antenna is

Continued on page 14

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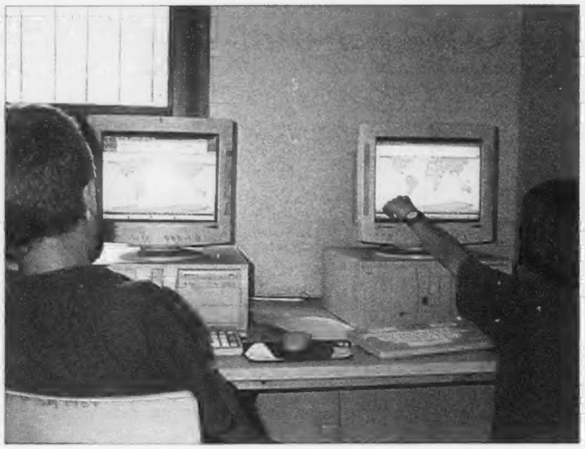

Photo K. *Daniel and Julian at AOS on RESURS using WINTRACK.*

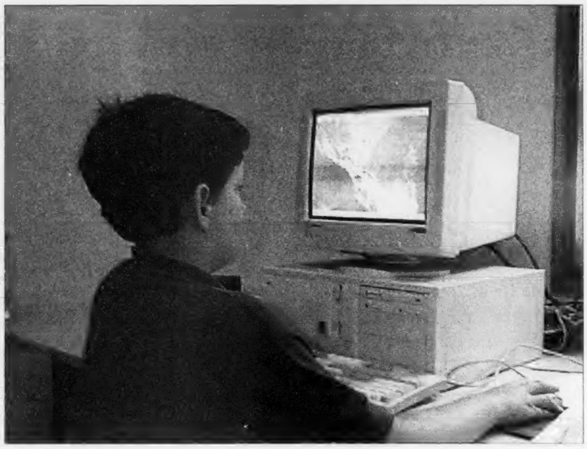

Photo L. *Tom studying WXSAT video of a front moving across Australia. This is the downlink video.*

Weather Sat Tracking is Awesome!

continued from page 13

tilted, the pointer points straight down, indicating the amount of tilt on the degree scale.

The pass controller selections are announced as soon as possible. The new controllers are first trained on the software and taught how to set up the computers for the day, and then drilled on quick shifts from satellite to satellite and how to predict future passes. It is important that the inbuilt computer calendar and clock is checked every day, as other students seem to like to tinker with the settings. Take special care with the AM and PM settings! (Hidden agenda: Good results rely on good preparation.)

Next, the controllers learn how to set up the antenna mount, feedlines, and telephone link. Particular attention should be paid to setting the compass rose to true north. Our compass rose has magnetic north lightly marked in ballpoint pen to help in aligning the compass rose with the magnetic compass.

Finally, the controllers complete their training with a number of live tracking exercises. All controllers are rotated through all of the positions. Six or so passes seem to be adequate. (Hidden agenda: Project leadership/management.)

A typical class of about 30 would make up five teams consisting of one controller and a group of five students. The controller selects their team with the help of the teacher. If the teams turn out to be uneven, put the shorthanded teams near the end of the schedule. This will allow any students who were sick or absent to get their chance. It is then the job of the controller to train his team. Occasionally one controller will help another with the training. Surprisingly, the teams choose to do a lot of their training on recess time and lunch time!

The team assignments are one pass controller as overall manager, two on the tracking acquisition computer running WinOrbit, two on antenna pointing, and one on the WXSAT radio downlink computer. I usually oversee the WXSAT computer so as to adjust for Doppler and do video restarts if necessary. The extra person on the two-person positions is to observe, prepare to rotate in, and constantly

Photo M. *Daniel and Julian during a "midtrack" change to another satellite.*

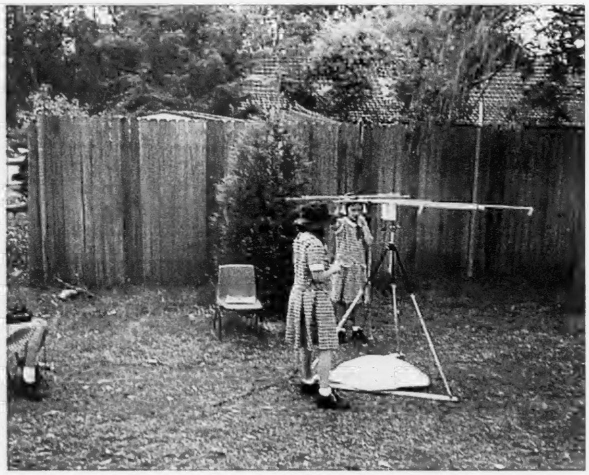

Photo N. *Sat tracking is fun!*

monitor the other person's work. Some job rotations can safely be done midpass. (Hidden agenda: Teamwork is the only way this exercise can be done.)

The controllers are instructed to try to set up approximately six weather sat passes per day for their team's turn. Choices will be made from the NOAA, Russian MET, and RESURS satellites, with advance checks to determine which of the satellites are active and transmitting on 137 MHz. Not quite so obvious is that passes must work around school hours, assembly times, and overlapping passes, although quick changes to switch satellites in a marginal midpass can be fun with a good team. Work through recess or lunch has not been a problem. Care must also be taken to select passes with reasonable elevations to extend track times, and if possible, to make sure that pointing angles will not be looking through buildings.

The students are amazed to actually hear the satellite at AOS and see live pictures from space being painted onto the screen of the WXSAT computer as the satellite tracks overhead. Picture quality using the Uniden scanner is surprisingly good. Cloud patterns and coastal outlines are seen clearly. It is also important to prepare the receiver so that the satellite can be heard over the loudspeaker. Remember, a team is putting on their show and wants to be heard. My setup used the line audio output to drive the computer soundcard. Since the receiver volume control had to be turned down very low to avoid overdriving the soundcard, I added a variable resistor in the receiver-to-soundcard patch cord to attenuate the soundcard input and achieve a decent level of speaker audio.

A good yagi allows tracking right down into the weeds. Many times, the teams would be pointing at the horizon waiting on rise time. At the instant of rise time, we would hear the satellite and get AOS. Nondirectional antennas could be used, but steerable antennas give longer pass times and better results, and allow a greater level of understanding in where the satellite actually is in space.

The four to six picture segments per pass are printed out and glued together to make a large mosaic record of the pass. Occasionally, a later pass can be joined onto a previous pass so as to get a current picture of most of our continent. The false color option on WXSAT makes the printouts even better.

About halfway through the exercise, I listened to a schoolyard argument between some kids during recess. One was saying that he got a bad deal because he only got a "low EL" pass. The other agreed that he did get a better overhead pass but his "look angles" at "rise time" had him pointing right into the school auditorium with its tin roof. It seemed to me that these two had learned something and really knew what it was all about. They actually sounded like a couple of

Continued on page 57

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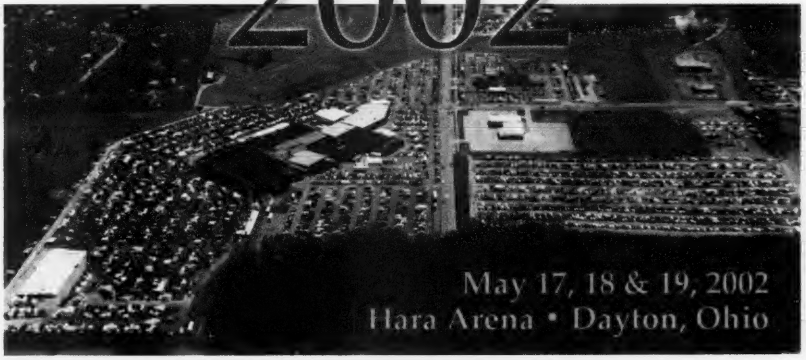

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That's right! It's better.

Radio operators can send high-speed CW with a speed key similar to the Vibroplex "Bug," but it's even easier when they use a keyer with self-completing dots and dashes.

In a strict sense, a keyer is just the switch that is closed to turn on the transmitter, but usually it includes more: It generates dots and dashes. The keyer described generates a self-completing dot-space or dash-space sequence with the momentary closure of a key. Self-completing means that a momentary closure of the dot key generates a full dot-space sequence. A momentary closure of the dash key generates a full dash-space sequence. That is, when a dot or dash is initiated it cannot be interrupted. The keyer requires an SPDT key: one contact to make dots and the other to make dashes.

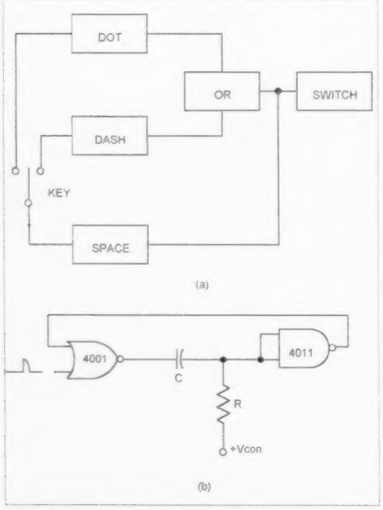


***Fig. 1. (a)** The keyer is built with monostable multivibrators. **(b)** The monostable multivibrator uses CMOS ICs.*

The keyer uses two inexpensive CMOS gates: a CD4001, a quad dual-input NOR gate, and a CD4011, a quad dual-input NAND gate, and a MOSFET switch. A run-of-the-mill N-channel power MOSFET can key anything from a low-power QRP transmitter to a California kilowatt. I used a TO-220 style MOSFET to key a 15 kW commercial transmitter.

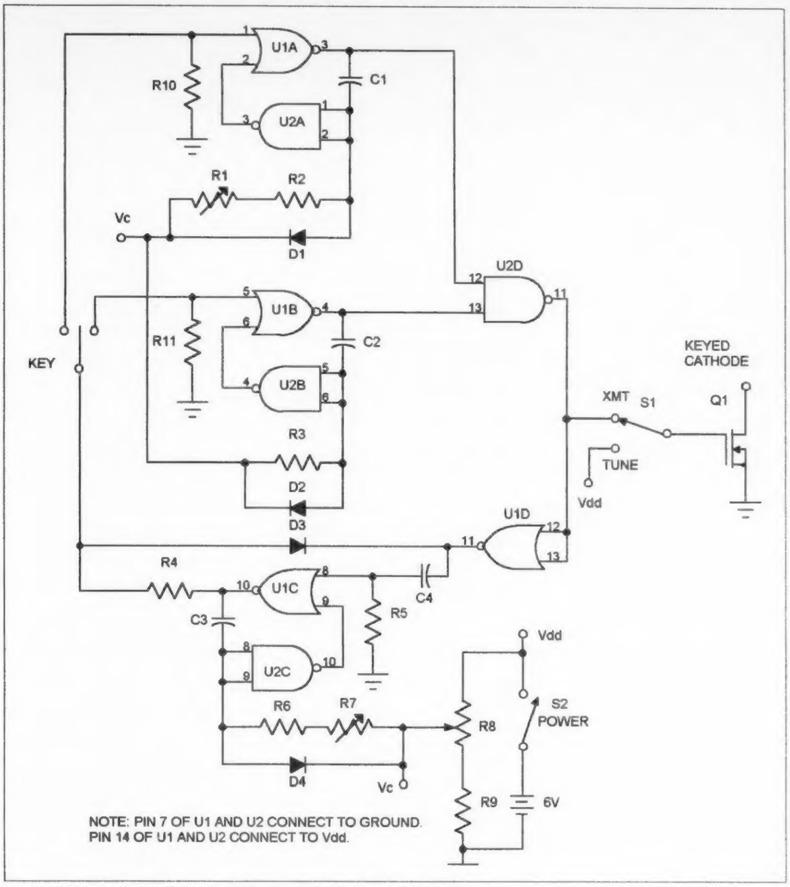
This keyer has speeds adjustable from about 25 words per minute (WPM) down to about 10 WPM. Of course, you can select any other speed range that suits your fancy by changing R2, R3, and R6, or C1, C2, and C3 in **Fig. 2**. The speed control gets pretty touchy at the slow end of the control range — that's why the range is limited to about 2:1. An audio taper or log taper pot will ease the problem of making small changes to the speed control voltage for obtaining slower speeds.

I suggest that for slow-speed operations the characters be sent at 10 or 15 words-per-minute, but with letters spaced to suit the receiver's speed. When a friend of mine went to take the test, she couldn't handle 5-word-per-minute characters, so the VEC upped the speed to ten and she had no problems. At 15 WPM or so you begin to hear the sound pattern that represents a letter, not the dots and dashes that form the letter. At 5 WPM the characters are so slow that you don't hear a pattern. Or at least I don't.

This keyer can be built for less than $10 and an evening's construction time. A printed circuit board is not necessary; point-to-point wiring or wire-wrap wire on perfboard is just as good. While I used wire-wrap sockets, it's certainly not required.

The keyer can run on a 9-volt transistor battery or four AAA 1.5-volt cells. A power MOSFET like the IRF630 can switch a final amplifier with 5 A of peak plate current and a cutoff voltage of 200 volts. The MOSFET needs a gate drive of less than 6 V, and the current is negligible. Battery drain is less than 0.1 mA.

The functional block diagram is shown in **Fig. 1(a)**. The timing blocks are three monostable multivibrators: One mono sets the time for the dot, one for the dash, and the third one for



NOTE: PIN 7 OF U1 AND U2 CONNECT TO GROUND.
PIN 14 OF U1 AND U2 CONNECT TO Vdd.

***Fig. 2.** The keyer uses 2 CMOS ICs and a MOSFET.*

the space. The basic monostable multivibrator is shown in **Fig. 1(b)**. Timing is set by the RC product and the control voltage, Vc. The inverters used in the monos should all be in the same package so that the timing of the three will track as the control voltage is varied. The spec sheets for the CMOS shows worst case threshold voltage varying as much as ±10%. However, when the gates are on the same chip, the thresholds track much better than 1%.

An N-channel power MOSFET is used as the keying switch. A common garden variety power MOSFET like the IRF630 will do the job. For other MOSFETs, choose one with VDS greater than the tube's cut-off voltage and ID capable of carrying the tube's peak cathode current. For solid state transmitters, the voltage to be switched probably will be less than 24 volts and the current probably a few mils. This can be done with a small TO-92 MOSFET like Motorola's 2N7000.

CD4001			CD4011		
A	B	C	A	B	C
0	0	1	0	0	1
0	1	0	0	1	1
1	0	0	1	0	1
1	1	0	1	1	0

***Table 1.** Truth tables.*

The monostable multivibrator is built around the CD4001, a CMOS quad dual-input NOR gate, and an inverter. The inverter is actually a CD4011, a quad dual-input NAND gate, with both inputs tied together. The truth tables for the ICs is given in **Table 1**.

In the stable state, the inverter's input is V_c. When V_c is greater than the IC's threshold voltage, $0.55V_{DD}$, the inverter's output is zero. The inverter's low output is fed back to the NOR's

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input. In the stable state both inputs to the NOR are low. In the timing state, the inverter's output is high and the NOR's output is low. The "high" fed back to the NOR's input keeps the NOR's output low after the trigger is removed. Subsequent triggers during the timing period then have no effect.

The multivibrator is triggered by a momentary high from the key. The arm of the key is high after the space following either a dot or a space and low during the space period and while the transmitter is "key down."

Taking the trigger input of the NOR gate above the threshold makes the output go low. This change in the NOR's output from V_{DD} to ground is coupled through the capacitor C to the inverter's input. The inverter's output then goes high to V_{DD}, and is fed back to the input of the NOR gate which holds the NOR output low. This condition prevails until the capacitor charges to V_{TH} through R at which time the inverter switches to it's stable state.

The diodes from the inverter's input to V_c clamp the maximum input voltage to V_c and permits the inverter's input voltage to return to V_c before the next trigger arrives. The diodes can be any small silicon diode — either the 1N4148 or 1N916 are good inexpensive choices.

Part No.	Value	Mfr. Part No.
C1, C2, C3a–c	0.1 µF ±10%	Kemet C320C104K5R5CA
C4	1,000 pF ±10%	Kemet C315C102K5R5CA
D1–4	1N4148 or 1N914	
Q1	IRF630	or similar, see text
R1, R7	500k ±20%	Piher PT15D-504
R2, R3, R6	680k ±5%	RC07GF684J or equal
R4	20k ±5%	RC07GF203J or equal
R5	100k ±5%	RC07GF104J or equal
R8	50k ±20%	Mouser 31CN405 or equal
R9	47k ±5%	RC07GF47J or equal
R10, R11	1 meg ±5%	RC07GF105J or equal
S1	SPDT	Mouser 633-M201201 or equal
S2	SPST	Mouser 633-M201101 or equal
U1	CD4001	Harris CD4001BE or equal
U2	CD4011	Harris CD4011BE or equal

Table 2. Parts list.

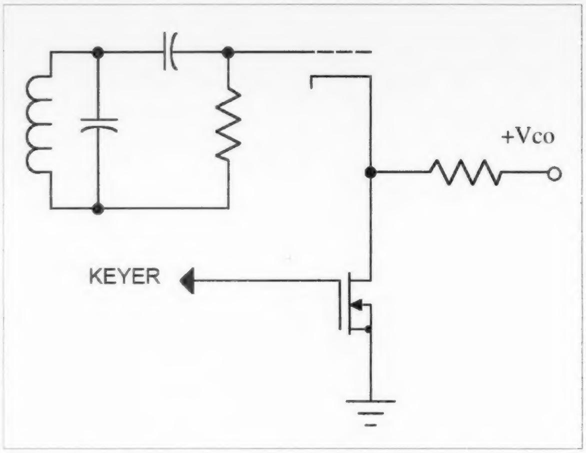

Fig. 3. A MOSFET can key the cathode of a vacuum tube amplifier.

The time required for the capacitor to charge to the threshold voltage is:

$$t = RC \times \ln(1 - V_{TH}/V_c)$$

where t is the time in seconds, ln is the natural logarithm, V_{TH} is device threshold, and V_c is the speed control voltage. V_c must always be greater than V_{TH}.

If you're comfortable working with logarithms you can skip the next paragraph, but if a little refresher is needed, read on.

A logarithm is the exponent to which the base must be raised to yield the number. For example, the common logarithm is base 10 and is written as log, but sometimes as $\log_{10}$. The log1000 = 3. That is, the base 10 must be raised to the 3rd power to produce 1000, $10^3 = 1000$. The base of the natural logarithm, denoted as epsilon e and written as ln, is 2.71828. To convert from the base 10 to base e, multiply the common logarithm by 2.3026, $\ln N = 2.3026 \times \log_{10} N$. Most calculators have entries for both common logarithms and natural logarithms. Just in case yours doesn't, remember that you can convert from common to natural logarithms by multiplying the common log by 2.3026.

The period of the shortest time, the dot or space, occurs when the control voltage is V_{DD}. The shortest time determines the maximum keying speed.

The period of a space or dot can be calculated from the standard word "PARIS" which is made up of 43 spaces. 25 words-per-minute equates to 1075 spaces per minute or 17.9 spaces per second. The time of a 25 words-per-minute (WPM) space or dot is about 56×10^{-3} seconds. Since the multivibrator's minimum period is 0.69RC, RC is about 80×10^{-3} seconds (0.1 µF and 800k) for 25 WPM. If your normal highest operating speed is 15 WPM, the time of a space is 93×10^{-3} seconds and RC can be changed accordingly to about 133×10^{-3} (0.1 µF and 1.3 megohms). The dot and space monos can use 0.1 µF multilayer ceramic capacitors. For the dash mono, a 0.3 µF is needed. Three 0.1 µF in parallel are an economical choice, but a 0.33 µF ceramic and an R of 720k works, too. The RC product is the important concern.

A positive-going input to the NOR gate from the key triggers the "key-down" mono, dot or dash, and starts the timing sequence. The negative outputs of the dot and dash NORs are combined in U2D, a NAND gate used as a negative input OR gate to produce a positive pulse to drive the N-channel MOSFET. From **Table 1** it is seen that U2D's output will be high if either input is low. The output is low when both inputs are high — that is, when the monos are in their stable states.

The output of U2D is inverted in U1D whose output goes high when the key is "up" after either a dot or dash. The positive transition of the output of U1D is differentiated with C4 and R5 to trigger the space mono. The output of the inverter U1D also clamps the arm of the key to ground during key-down so that neither the dot nor the dash can be triggered until after the full sequence is completed.

Fig. 2 shows the schematic of the complete keyer. The component values are given in **Table 2**. The parts used are commonly available from any electronics distributor. Radio Shack Unlimited is one source and Mouser Electronics is another. **Fig. 4** shows the wiring of 14-pin headers that hold the passive components. Wire-wrap headers and sockets for the ICs make it convenient for wire-wrapping. Of course, sockets aren't really necessary, just convenient.

The period of a dash is the reference time. The dash period is ideally equal to the period of three dots or spaces. The trimmers R1 and R7 are adjusted to account for component tolerances and to make the three-to-one timing, or to change the weight of keying.

Adjusting the trimmers is a piece of cake: Connect an average-reading voltmeter from U2-11 to ground: Put the key in the dash position and adjust the space trimmer R7 so that the meter indicates exactly 25% of V_{DD}. The dash is "key-down," V_{DD}, for three periods of time and "key-up," zero volts, for one period of time for a duty cycle of 25%.

Adjusting the dot trimmer is equally simple. Put the key in the dot position, and since the dot is ideally equal to a space, adjust the dot trimmer R1 to make the meter reading half of V_{DD}. That's it. The dot trimmer and space trimmer are set-and-forget.

It's a good idea to make the adjustments with the speed control set for the highest speed so that the meter doesn't try to follow the keying. While the adjustments described are for the ideal 1:1 dot-to-space ratio and 3:1 dash-to-space ratio, the keying weight can be changed by juggling the trimmers to suit your preference.

In passing, note that all digital DC multimeters do not necessarily indicate average. In that case, you'll need a low-pass RC filter between U2-10 and the meter. An R of 1 meg or more in series with the meter and a C of 0.1 µF or more across the meter will smooth out the fluctuations and keep the meter reading steady. While the indicated voltage depends on the voltmeter's input resistance, the absolute indication is of no concern. The relative value of "key-up" to "key-down" is what's important. The "Tune" switch keeps the key down to get the "key-down" voltage reading.

Adjusting the keying weights off the air with a code practice oscillator is considerate of others on the band. A code practice relaxation oscillator that can be gated with the keyer is shown in **Fig. 5**. The simple code practice oscillator shown is built around two sections of a CD4011 that are keyed with the output of the keyer U2-11. The oscillator is gated "on" when the input from U2-11 is "high" or "key-down." The frequency of oscillation is approximately 1/(1.4RC). For 700 Hz C is 0.01 µF and R is 100k. The unused sections of the IC should be tied to ground or V_{DD}.

The edges of the oscillator waveform are very fast and can get into almost any AM radio, so that a separate audio amplifier won't be needed, use the radio to monitor your fist. If you want to use separate headphones, a simple 2N3904 bipolar transistor operated as an emitter follower as shown in **Fig. 5** can easily drive them.

Fig. 3 shows how the MOSFET can key a typical vacuum tube final amplifier. When keying a tube's cathode, the MOSFET will be switching a voltage in the range of a hundred volts. For safety's sake, the switch should be located near the tube to keep the high voltage away from the operator.

Since the temperature near the tube is probably high, some nominal heat sinking of the MOSFET switch may be needed. The dissipation in the MOSFET is $I_{cath}{}^2R_{DSon}$. For most kilowatt transmitters, the final's peak cathode current is under 3 A and the MOSFET's drain/source voltage is under 2 volts, so the dissipation is a few watts.

Even though the duty cycle of CW is low the transistor's thermal time constant is short, so that the transistor's junction temperature follows the peak dissipation. In any event, the MOSFET

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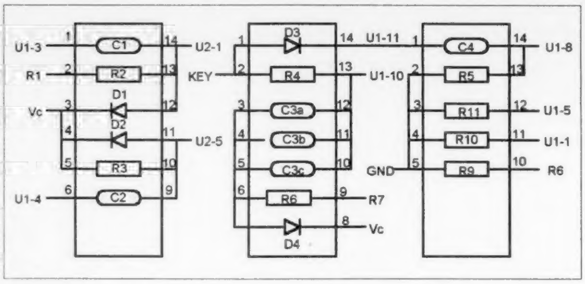

Fig. 4. The passive components can be mounted on three 14-pin headers for wire-wrapping.

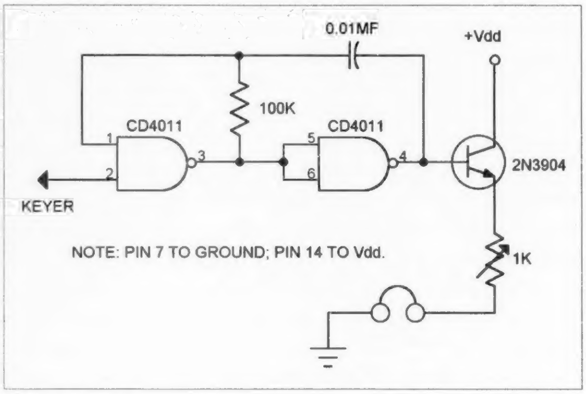

Fig. 5. A code practice oscillator can be built with a CMOS CD4011.

case should be kept below finger-tolerable hot. Blisters aren't desired. A small heat sink should keep things in bounds. The temperature of the collector can safely be sensed (touched) when the key is down, but when the key is up, the transistor tab (drain) voltage is high. I feel more comfortable touching the transistor immediately after the transmitter HV is turned off and the HV shorted to ground with a gimp stick or shorting bar on the HV before reaching in to touch the transistor's tab. Grounding the HV is a smart move when touching the transistor's tab. The temperature of the tab won't change that much while the HV is being shorted.

Keying a solid state amplifier doesn't require switching high voltages and the MOSFET switch can be located within the keyer. The power dissipation is a few milliwatts, so a small MOSFET like Motorola's MPF7000 is fine.

Adding a "Tune" switch S1 to keep the final on continuously while tuning can be accomplished with an SPDT switch that connects the gate of the MOSFET to V_{DD}.

When the keyer is enclosed in a minibox, the front has a "Speed" control potentiometer R8, an "On-Off" power switch S2, a "Tune" switch S1, and a jack or contacts for an external key.

This keyer can complement the CW fan's station without upsetting the budget or seriously detracting from operating time. The parts are available from Radio Shack Unlimited (RSU) at 1 (800) 843-7422, or Mouser Electronics, 958 Main St., Mansfield TX 76063, phone 1 (800) 346-6873. If you don't have their catalog, they'll be glad to send you one.

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This usually requires the presence of a tree or some portable structure to support it. On the 440 MHz band, a simple and very effective answer to the problem is a "J" antenna that can be mounted directly on an HT, thus making the system as portable as the HT itself.

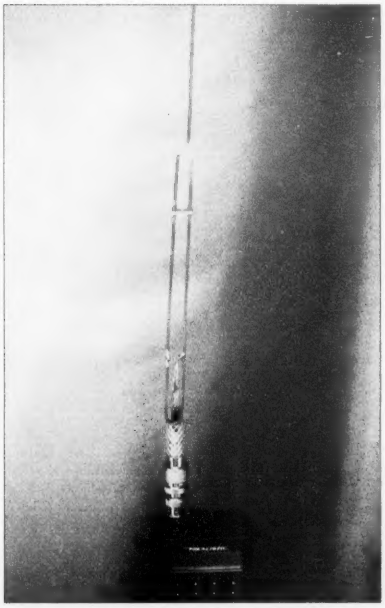

Photo A. *The construction of the matching section portion of the antenna.*

While not as small as a rubber duck, this antenna is not unduly cumbersome, and it gives substantial lift to the output of an HT. The overall length is about 24 inches. It weighs about 5 ounces. In fringe area operations, you can expect practical improvement over a rubber duck from poor or no copy at all to usable or maybe even solid copy.

An AEA model SWR-121V/U Antenna Analyst was used to arrive at the dimensions and for the SWR and return loss data shown in **Table 1**. Return loss is a relatively recent concept in evaluating loss in antenna systems and is defined in the *ARRL Handbook 2001* (page 19.4) as the reciprocal of the reflection coefficient in dB. Since reflected power is always less than forward power, return loss is a negative value. Hence, the larger the return loss figure, the smaller the power loss. It would seem more logical to define return loss as the ratio of reflected power to forward power, expressed in dB. The standard formulas for SWR and decibels seem to confirm this. It will be noted that the dimensions of a "J" antenna do not always coincide with textbook formulas. The "J" antenna is a derivative of the old "Zepp" antenna, which used an open-wire transmission line feeding the quarter-wave matching section. Everything was pretty much straightforward and copacetic — the balanced transmission line fed a quarter-wave matching section which was also balanced. The only departure from this consistency was in connecting the matching section to the antenna,

Freq.	SWR	Return MHz Loss, dB
439	1.5	−13.8
440	1.4	−15.1
441	1.3	−16.6
442	1.2	−20.0
443	1.1	−26.3
444	1.0	−50.0
445	1.0	−50.0
446	1.0	−50.0
447	1.0	−38.7
448	1.1	−26.3
449	1.1	−24.0
450	1.2	−18.2
451	1.3	−16.6
452	1.4	−15.1
453	1.5	−13.8

Table 1. *SWR and return loss data for the direct-mount "J" antenna.*

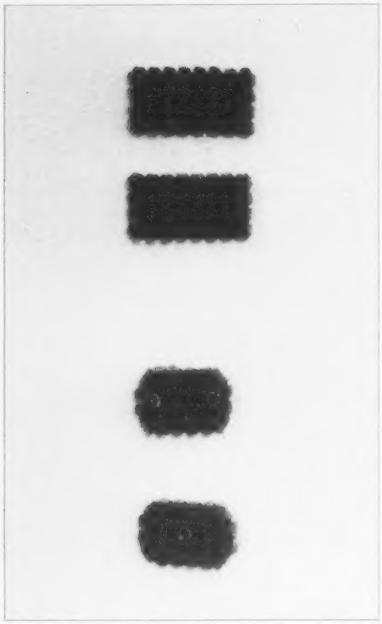

Photo B. The perfboard before and after snipping off the corners and ends so they will fit loosely inside the PVC pipe.

which was a half-wave wire connected to one side of the matching section. The other side of the matching section was left floating. Although no balanced-to-unbalanced transformer device was used, the antenna worked and served its intended purpose.

In "J" antennas, amateurs generally use coax, which is an unbalanced line, to feed the matching section which is a balanced quarter-wave line, and one side of this line is connected to an unbalanced load consisting of a single half-wave wire end fed. In some applications, such as this particular antenna, physical constraints do not permit using a balun to provide proper decoupling. The result is that common currents intermingle and neither the radiator nor the matching section, nor even the coax line, knows where the currents of one stop and the other begin. Consequently, the physical dimensions of the three elements of the system become interdependent. That being the case, varying combinations of dimensions will result in varying resonant frequencies with varying SWR bandwidths.

The antenna is made of no. 14 solid copper wire formed as shown in **Fig. 1**. The wire is enclosed in 1/2-inch thinwall PVC pipe with a weatherproof cap at the top and a PL-259 fitting at the bottom. The PL-259 plugs into an SO-239/BNC adapter (Radio Shack 278-120), which mounts directly onto a hand-held 440 MHz transceiver.

Spacers are used to keep the wire centered in the PVC; these are made by breaking off two 3/8" x 13/16" pieces of unclad perfboard. Each piece will have three holes by seven holes. The hole in the center will be enlarged on one piece for the radiating element. On the other piece, two holes, about 13/32" apart, one on each side and equidistant from the center hole, will be enlarged for the matching stub. Use a 1/16" drill to enlarge the holes in the spacers, pushing the drill back and forth a few times so that the #14 wire is a snug fit. Snip off the corners and then snip off the pointed ends of the spacers so they will fit very loosely inside the PVC pipe. No filing will be necessary unless you wish to smooth the rough edges.

Straighten a piece of #14 solid copper wire about 3 feet long, by hand, so that it is reasonably straight, and then clamp one end in a well anchored vise or some solid object. Then, with a hefty pair of pliers at the other end, give it a sharp tug, and that will finish the straightening. Make a U-bend about 7 inches or so from one end, by laying it across the shank of a 5/16" drill bit. Use a pair of diagonals to cut the radiator leg about 2 ft. from the U-bend. Use a file to round and smoothen the ends of the wire to facilitate installing spacers. Before you make the other centering bends, push the spacers for the matching stub and the radiator element onto the wire. On the matching section, place its spacer about 5-1/2" from the U-bend. On the radiator element, place its spacer about 19 inches from the U-bend. A snug fit is desirable so that the spacers will remain in a horizontal position on the wire and not flop around. After the spacers are in place, make the double bend in the radiator element for centering just above the matching section. Next, measure and cut the matching section and radiator lengths slightly longer than the dimensions shown in **Fig. 1**.

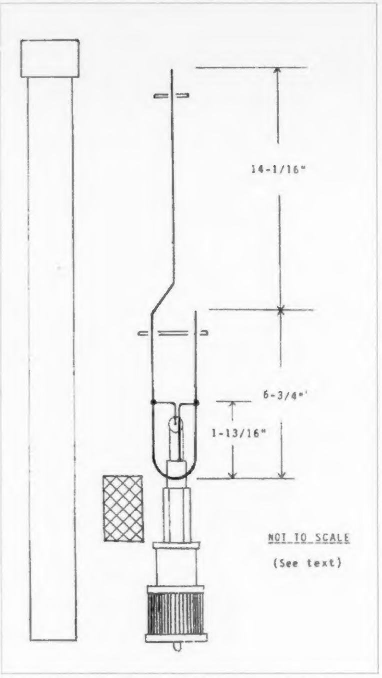

Fig. 1. Form the "J" of no. 14 solid copper

Fig. 3 shows the initial plot of an antenna with such random length elements, before doing any trimming. The radiator element was 14-5/8" and the matching section length was 7-1/8". The feed point was 1-13/16". This information is given just in case someone may have an interest in the low end of the band. You can trim the elements later, very carefully and in small increments, to arrive at the desired resonant frequency.

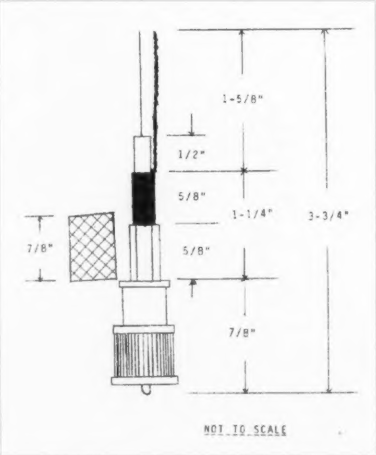

Fig. 2. Coax assembly measurements. Use a soldering iron to melt the insulating material. Do not pull. (Drawing not to scale.)

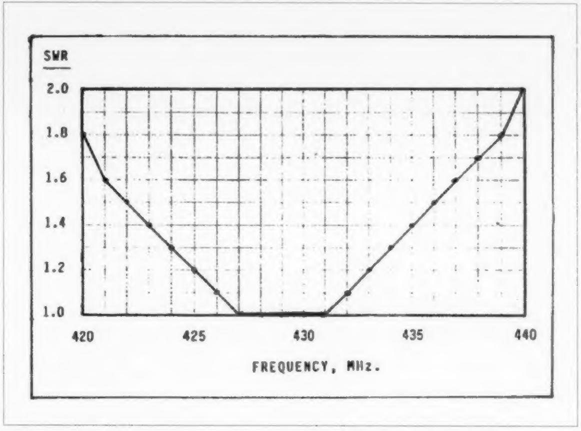

Fig. 3. *Initial plot on an antenna, before trimming element lengths. See text.*

The coax assembly consists of a short piece of RG-58 with a PL-259 connector attached (cut from one end of a Radio Shack #278-968), and a short piece of nylon-mesh-reinforced plastic tubing. This particular tubing is used for high-pressure lines and is sold at PVC supply stores. The inside diameter is about 1/4"; the outside diameter is a little over 7/16". In cutting and trimming the RG-58, be very careful with the knife and constantly watch for loose strands. Cut the coax at a point so that the overall length from the tip of the center pin to the cut is 3-3/4". This is the final dimension of the overall length of the PL-259/RG-58 coax assembly. Remove the black vinyl outer covering to a point 5/8" from the metal shank. Comb the braid out, straighten the strands, and twist them into a straight, round lead. Carefully remove the insulation on the center conductor to within 1/2" of the black vinyl. It is important that you use a soldering iron to melt the insulation material from the wire. If you try to strip and pull on the insulation this close to the PL-259 fitting, you run the very real risk of dislodging the center conductor from the pin on the PL-259. See **Fig. 2**. Slip the 7/8" piece of clear plastic tubing over the braid and the center conductor leads, and push it tight against the metal shoulder on the PL-259. You may have to stretch the hole in the tubing by using a tapered rod, tool, or ballpoint pen so that the tubing will fit tight against the PL-259. Lay the U-bend of the matching section on the black vinyl that covers the coax, and butt the U-bend of the matching section against the end of the plastic tubing.

Watch carefully for any loose strands, and check spacing so there won't be unwanted shorts. Orient the coax so that the center conductor is vertically above the braid where it exits the plastic tubing. Bend the bare ends of the center conductor and the braid lead to form right angles about 3/16" from their ends, so they will touch the matching section feedpoints at right angles at exactly 1-13/16" above the bottom of the U-bend. Just a spot-solder connection is advisable and adequate.

To ensure that the spacers will stay put in their respective positions on the #14 wire, use a toothpick and apply a small dab of clear silicone caulk onto the wire where it passes through the holes in the spacers.

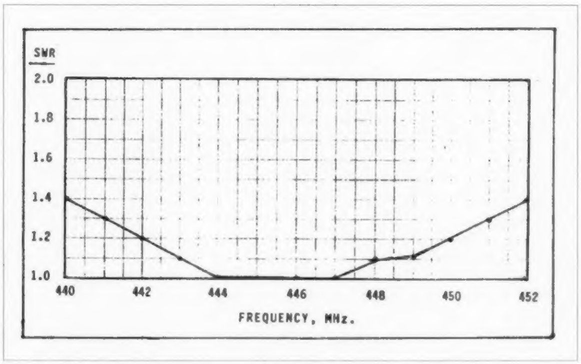

Fig. 4. *Plot of SWR values in* ***Table 1****.*

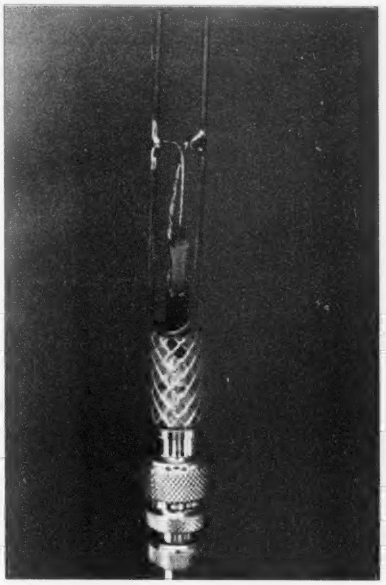

Photo C. *The coax assembly, spot-soldered to the matching section.*

The PVC goes over the knurled retaining collar on the PL-259 connector. In **Fig. 1** the plastic tubing and the PVC pipe are shown alongside the antenna assembly for clarity. A Radio Shack #278-120 adapter finishes the construction. Depending upon the particular PVC pipe you use, it may or may not fit snugly onto the PL-259

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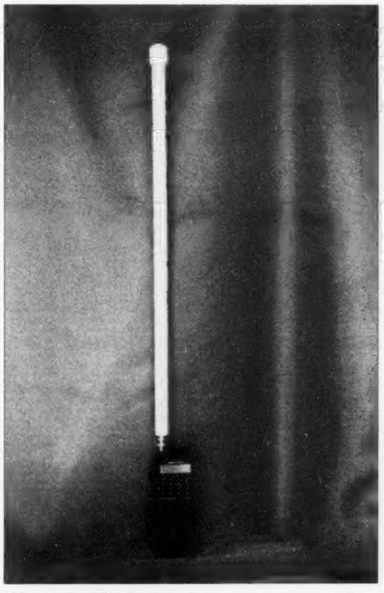

Photo D. *The finished antenna mounted on the HT.*

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Manhattan Beach CA 90266-4025

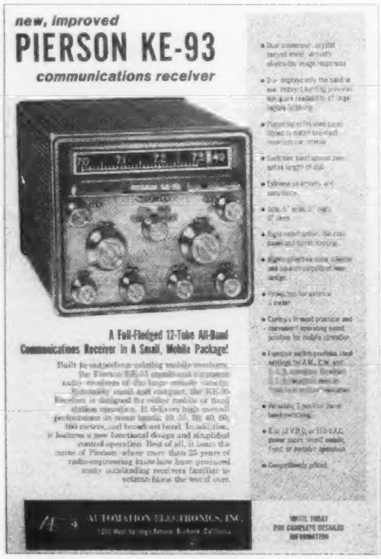
New Life for a Pierson KE-93

Part 1 of 3.

Once upon a time, there was a miniaturized multimode communications receiver developed for ham radio during the 1957 time period. It was called a KE-93, designed and built by Pierson in Burbank, California. This receiver had little competition in size and capability, and yet it sold for $199 (power supplies were extra). This price was very competitive with those of other receivers within the field at the time.

My friend, Johnny WB6HYR, loaned me his Pierson KE-93 to see what I could do with it since the receiver had been out of service for many years. As received by me, it was badly weathered and appeared to be an abandoned orphan. Having seen them years back, but not having worked with one, left me with the feeling of "wanting to examine the beast." Working with the Pierson has been quite an experience and one that I hadn't anticipated at all. Since I am quite familiar with tubed receivers of the era, I really expected the Pierson to be comparable. What a surprise! It turned out to be BETTER than the run-of-the-mill 1950s-era communications receivers. In fact, in running comparable tests on it versus the newer solid-state receivers, the Pierson performed at very close to the same parameters as the newer gear.

I had no information on the Pierson, so everything had to be "discovered" as I worked my way through it. In addition to the receiver, I also received



new, improved

PIERSON KE-93

communications receiver

A Full-Fledged 12-Tube All-Band Communications Receiver In A Small, Mobile Package!

AUTOMATION ELECTRONICS, INC.

WRITE TODAY FOR COMPLETE DETAILED INFORMATION

Fig. 1. *A 1957 advertising page for the Pierson KE-93 communications receiver.*

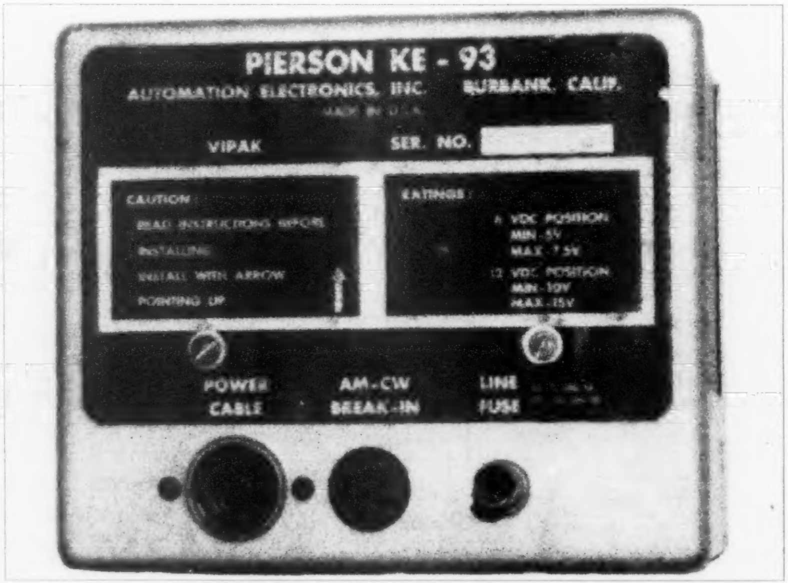

PIERSON KE - 93
AUTOMATION ELECTRONICS, INC.
BURBANK, CALIF.
MADE IN U.S.A.
VIPAK
SER. NO.
CAUTION:
READ INSTRUCTIONS BEFORE
INSTALLING
INSTALL WITH ARROW
POINTING UP
RATINGS:
6 VDC POSITION
MIN-5V
MAX-7.5V
12 VDC POSITION
MIN-10V
MAX-15V
POWER
CABLE
AM-CW
BREAK-IN
LINE
FUSE

Photo A. *Front panel view of the "VIPAK" Pierson mobile power supply.*

the mobile and base power supplies that were sold as companion items. The biggest challenge for me was to develop as much information regarding the receiver as might be needed to gain an understanding of it as well as restore it to an operational state. I did locate one of the original published advertising pages for the Pierson and have included that here — shown in **Fig. 1**.

My approach to the restoration process was to open the power supplies and make sure they were operational since the base power supply, at least, would be required to operate the receiver. I drew up schematics for both power supplies as a starter and will share them during the discussion of the supplies. Drawing up a schematic for the receiver turned out to be nearly impossible because of the very compact nature of the physical design. I was able to obtain sufficient information to become comfortable with the knowledge obtained. What I learned about the receiver will be shared during the discussion of it.

Before starting into a discussion on the power supplies, let me say that anyone owning a Pierson KE-93 communications receiver is very fortunate. Yes, the receiver is worth its weight in performance. True, it uses "fire bottles" and it gets hot, but it still performs marvelously well for its age. Though I'm easily impressed, the performance of the receiver speaks for itself.

Power supplies

I'll open the discussion with the mobile power supply (see **Photos A**, **B**, and **C**) because it is available as part of the original equipment. However, it's unlikely that anyone would use either the mobile supply or the receiver in a mobile application in today's ham environment. Studying the mobile supply provides some insight into the design thinking that took place in the 1950s era.

The schematic for the mobile power supply is shown in **Fig. 2**. Two rectification types were used in mobile power supplies during the period, with one type using a tube rectifier. The other type, as used in this supply, is a synchronous vibrator which not only chops the applied DC power, but also has the second set of contacts synchronized to "rectify" the output, so to speak.

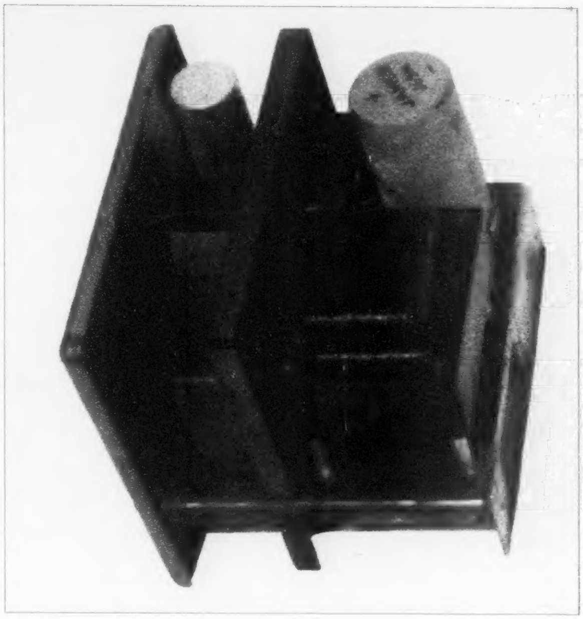


Photo B. *Inside top view of the mobile power supply.*

Judging from the design, I suspect the supply was designed as a universal type suitable for use with many applications. As designed, the supply's flexibility allowed it to be used with either a positive or negative battery ground system in addition to operating on either a 6- or 12-volt system.

To increase the application flexibility, it appears that a built-in connector could be used to change the DC output voltage parameters as well. I didn't investigate that possibility, however. For use with the Pierson, no connections or jumpers to the connector were required. For the Pierson KE-93 application, the supply configuration was accomplished through the two 6-pin Amphenol connectors mounted on the front panel.

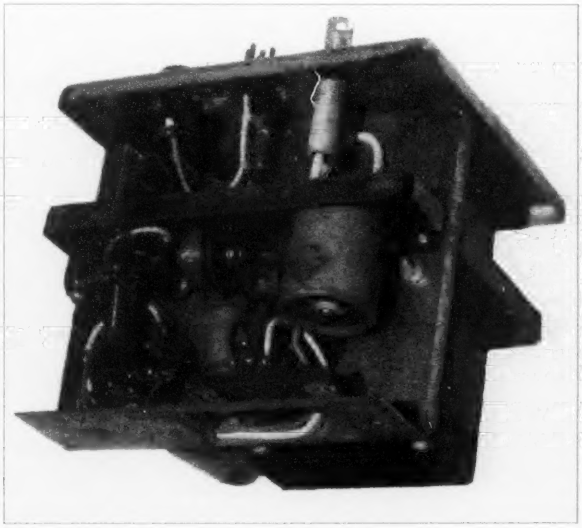


Photo C. *Inside bottom view of the mobile power supply.*

The vibrator parameters are shown on the schematic for reference. Vibrators were available from two sources, James and Radiart, and they were interchangeable in this supply. Of interest is the fact that the vibrator operated at 115 Hertz to create a near square wave of AC power for the transformer primary. Sharp corners were developed by the vibrator and appeared on the transformer's secondary as spikes. A small value buffer capacitor was selected (similar to tuning) to reduce the overshoot, or spiking, condition. Voltage spiking is hard to filter, so smoothing it aided the output filtering process. In addition to reducing the spiking on the secondary, the buffer also reduced the sparking that occurred between the vibrator's primary contacts. Contact arcing would destroy a vibrator in a short period of time, so making sure the buffer capacitor was

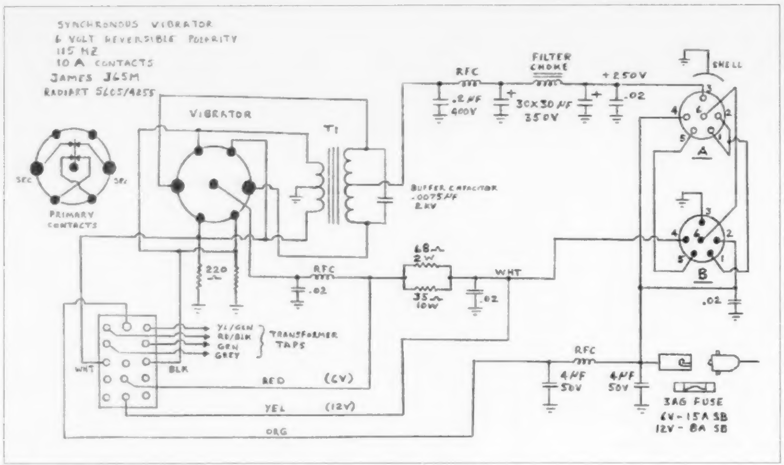

SYNCHRONOUS VIBRATOR
6 VOLT REVERSIBLE POLARITY
115 HZ
10 A CONTACTS
JAMES J65M
RADIART 5605/4255
VIBRATOR
T1
SEC
SEC
PRIMARY CONTACTS
BUFFER CAPACITOR .0075µF 2KV
RFC
FILTER CHOKE
+250V
SHELL
.2µF 400V
30X30µF 350V
.02
A
B
220Ω
RFC
.02
68Ω 2W
35Ω 10W
.02
WHT
.02
YL/GRN
RD/BLK
GRN
GREY
TRANSFORMER TAPS
WHT
BLK
RED (6V)
YEL (12V)
ORG
RFC
4µF 50V
4µF 50V
3AG FUSE
6V - 15A SB
12V - 8A SB

Fig. 2. Schematic diagram for the KE-93 companion mobile power supply. This supply was designed for 6- and 12-volt operation, and it accommodates a positive or negative battery ground system. Connector "A" is a female and connector "B" is a male.

"tuned" properly was critical. Because of the noise created by the vibrator, extensive filtering was imperative to provide a nearly pure DC output for the receiver. Shielding was required to keep the emitted RF noise to a minimum.

Base supply

The base power supply designed for use with the Pierson KE-93 is conventional, as shown in **Fig. 3** and **Photos D, E,** and **F**. AC power is transformed from 115VAC to 5OOV for the center-tapped HV secondary, 5V for the rectifier filament, and 6.3V for the receiver's tube heaters. With the receiver as a load, the B+ supply voltage measures near 220V and is provided to the receiver through a power cable attached to the power supply. AC power and heater voltage is switched at the receiver through the power cable.

For ham applications, the receiver can be placed on standby during transmit through the connector mounted on the rear of the supply. Typically, transmit relay contacts were used to switch the HV center-tap to ground during receive. A switch mounted on the front panel of the power supply is used to perform the standby function manually.

Included within the base power supply is the speaker along with the "S"-meter and its control circuit. The meter control circuit consists of a 6BJ6 tube used as a variable resistor in one leg of a bridge circuit. The meter will read zero when the bridge is balanced. The control grid (pin 1) of the tube is connected to the AVC circuit within the receiver. With an increase in incoming signal strength, the AVC voltage will swing in a negative direction, increasing the tube's resistance and causing the meter to swing up scale.

One of the things that I discovered with the Pierson was that the "S"-meter responds quite accurately to the strength of an incoming signal that I provided from a calibrated signal generator. The meter rises one "S"-unit for each 6dB of signal voltage level increase. I checked the meter indication at both S-9 and 54dB over S-9 to see how well it tracked, and the meter indications did track.

While bringing up the power supply, the two wirewound calibration pots that set the meter limits were dirty, creating an intermittent meter operation. Rotating the pots back and forth slightly cleaned up the contacts and stabilized the meter. Of course, moving the pots upset the meter's calibration, so I had to repeat the S-9 and 54dB over S-9 calibration to restore the accuracy.

Before leaving the base power supply, let me describe briefly the process that I used to prepare the supply for the application of AC power. As I've always said, it's more than just a little scary to apply AC power to a supply that hasn't been powered up for several years.

The one technique I've found that works nearly every time follows this simple procedure that is performed to protect the supply:

(1) Measure the DC resistance of the B+ line. A resistance value of 10k ohms or higher is desired. (a) If the resistance is higher than 10k, then the chances of damage occurring is minimal with the application of power. (b) If the resistance is lower than 10k, extreme care must be taken. The outlined procedure described here can be attempted, but monitoring is definitely required. Changing the filter capacitors may be a necessity if they fail to

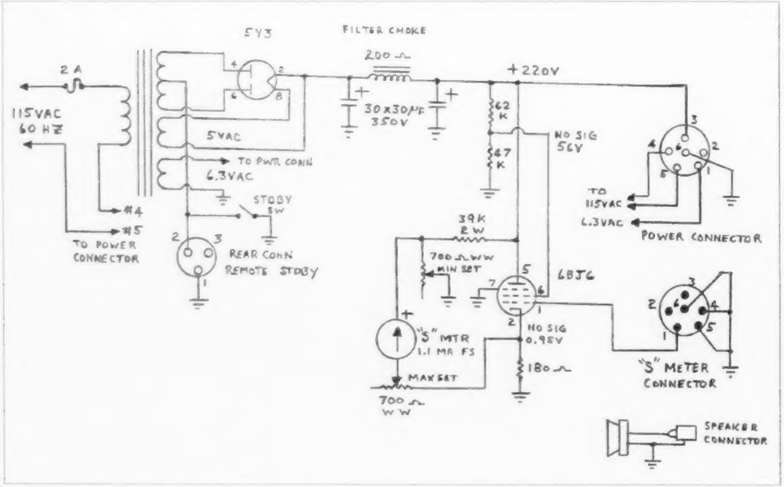

5Y3
FILTER CHOKE
200Ω
+220V
2A
115VAC 60 HZ
5VAC
TO PWR CONN
6.3VAC
30X30µF 350V
62K
47K
NO SIG 56V
STDBY SW
#4
#5
TO POWER CONNECTOR
REAR CONN REMOTE STDBY
TO 115VAC
6.3VAC
POWER CONNECTOR
39K 2W
700Ω WW MIN SET
6BJ6
"S" MTR 1.1 MA FS
NO SIG 0.95V
180Ω
MAX SET
700Ω WW
"S" METER CONNECTOR
SPEAKER CONNECTOR

Fig. 3. Schematic diagram for the KE-93 companion base power supply. A speaker and "S"-meter circuits are included within the supply.

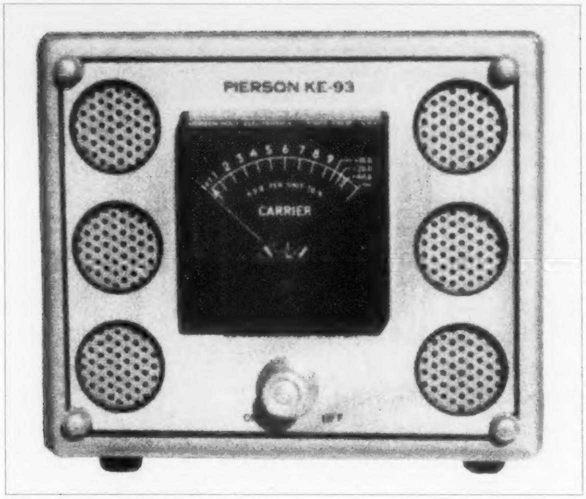


Photo D. *Front panel view of the Pierson base power supply. The "S"-meter and manual transmit standby switch are shown.*

reform properly using the following procedure.

(2) Connect a HV DC voltmeter to the B+ line. Be sure the receiver is disconnected from the power supply during this procedure.

(3) Using a light bulb connected in series with the power line to the power supply to act as a "safe load," use a Variac to control the amount of AC voltage applied.

(4) Raise the line voltage in small increments until the voltmeter begins to show a value of about 50 volts for the Pierson supply.

(5) Without resetting the Variac, monitor the B+ voltage value while observing for any voltage change. As the filter capacitor's dielectric reforms, the voltage across the capacitor should rise.

(6) When the voltage stabilizes after a rise, increase the Variac to obtain another 50 volts and monitor the value for stabilization at some higher level.

(7) Continue the steps outlined in 4 through 6 until the B+ voltage value reaches about +250 volts for the Pierson supply.

(8) Allow the B+ voltage to remain at 250V for at least an hour before connecting the supply to the receiver.

(9) With the receiver attached and before applying full B+ voltage to it, monitor the B+ line voltage and raise the voltage slowly. The objective is to determine that the receiver is capable of handling the voltage without damage.

Problems found

During the process of bringing up the power supply and the receiver, I ran across a number of problems. Each had to be resolved before the receiver was deemed "good" and ready to go. I'll list the items here and discuss them further as they apply to the subject.

(1) Power supply filter capacitors required reforming.

(2) Dirty and corroded plug connectors.

(3) The power switch attached to the volume control failed.

(4) Heaters of tubes V3 and V4 failed to light.

(5) Found a cut 2W resistor lead connected to the heater circuit of the VFO oscillator (V3).

(6) A cracked 12µF/25V electrolytic capacitor connected to V9's cathode.

(7) Dried out filter capacitor in the cathode of V12.

(8) One 4.7k resistor had changed value to 9k ohms.

(9) The dial cord path was dirty causing the dial cord to jump track.

(10) Chassis was badly rusted.

(11) Exterior of the cabinet and dial face were dirty and partially corroded.

(12) The meter SET pots were dirty.

(13) The tuning capacitor and turret shaft bearings required lubrication.

(14) All of the potentiometers were noisy/dirty and required cleaning.

Comments

Starting with a piece of unknown equipment such as the Pierson KE-93, with its complexities, was quite an experience and challenge. Nearly every step toward restoration had to go through a "discovery" process where sufficient information could be developed to enhance an understanding of what was going on.

Part 2 of this series will continue with the problems encountered and preparing the receiver to operate.

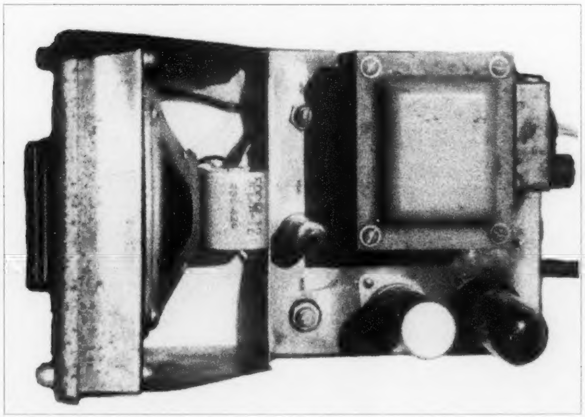


Photo E. *Inside top view of the base power supply. The two "S"-meter calibration pots are visible.*

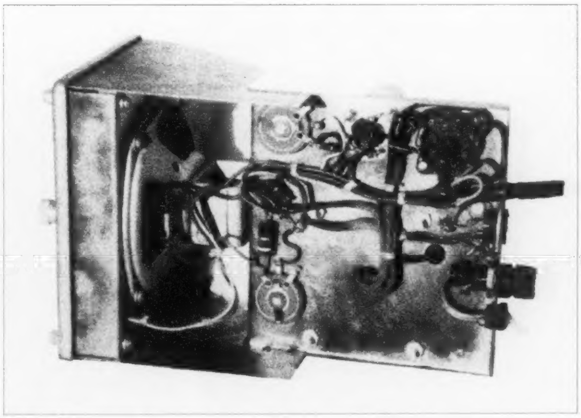


Photo F. *Inside bottom view of the base power supply. Note the neatness of the assembly operation.*

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Lamps from Tubes

For fun and profit — and gifts!

I have always had a spot in my heart for tubes. You know that old saying, "Real radios glow in the dark." I know that transistors are here to stay, but I do derive some pleasure from looking at a large tube, seeing the big graphite plates, and looking down from the top at the grid wires. Try doing that with a transistor.

My shack already had many of my favorite tubes mounted on nice pine wood bases. These were conversation pieces to say the least, especially with the younger set (which at my age seems to include everybody).

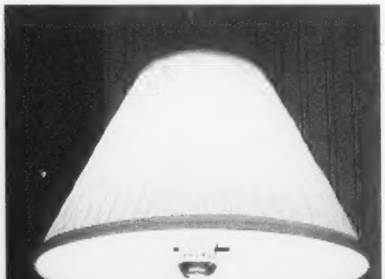

Photo A. *My first lamp — and my favorite — is made from an 813 tube.*

Walking through the electrical department at our local Home Depot, I spotted a "Make-A-Lamp Kit for Bottles," and it dawned on me that I might have a better way of showing off those tubes sitting in my shack. I was going to make a lamp.

Getting started

A Philadelphia company named Angelo distributed the kit that I started with. I wasn't sure how I was going to do this, but at least I had a starting point. The kit came with the electrical fixture and line cord, as well as different-size rubber plugs that were supposed to hold the assembly in the bottle. Of course, I wasn't going to use it this way, so I had to adapt things a bit.

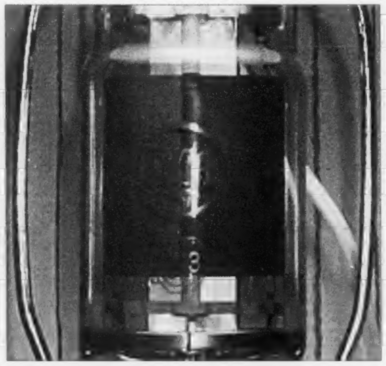

Photo B. *A beautiful RCA logo on my 813 tube.*

The first lamp that I built used my 813 tube. I was already displaying this tube in the shack. If you look at **Photo B**, you will see that the tube has a

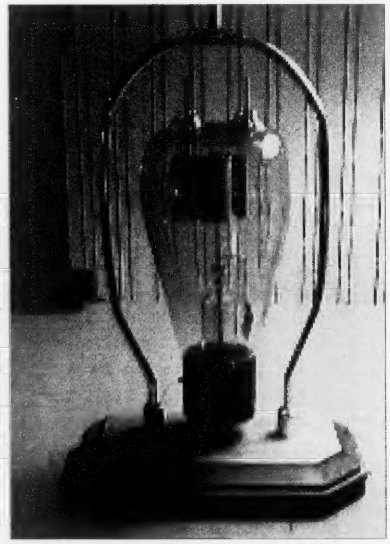

Photo C. *The tube mounted on the base inside the harp.*

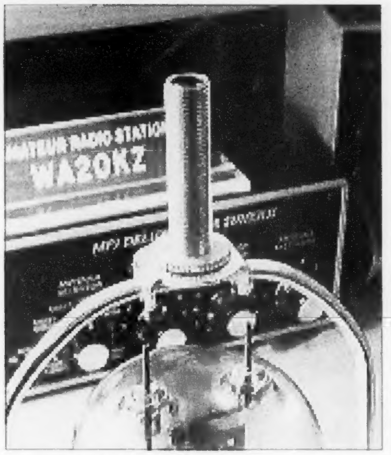

Photo D. *Solder the nut with the threaded pipe to the top of the harp.*

beautiful RCA logo. The base of the tube has a unique serial number, and the date of manufacture was April 1941. With its heavy-duty construction and graphite plates, it was quite a conversation piece.

Constructing the lamp

When I bought the lamp kit, I also purchased the metal frame that outlines the tube. In lamp circles, this frame is known as a harp. What I visualized was the tube inside the harp, and somehow the light socket and shade above it. I drilled another two holes in the base about 1 inch from either side of the tube and pushed the ends of the harp into the wood. Looking at **Photo C,** you can see how the harp fits nicely around the tube. Each step brought me a little closer to my lamp!

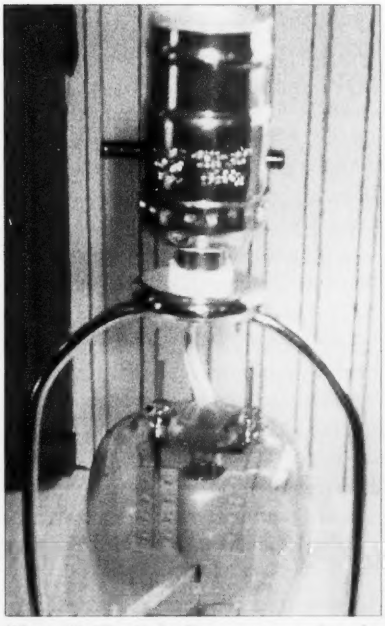

Photo E. *The light fixture mounted to the harp.*

I wasn't exactly sure of the best way to mount the light socket. In the light kit was a brass 1/8 IP thread locknut and a small piece of threaded pipe. I took a heavy-duty soldering iron and soldered the locknut to the top of the harp as shown in **Photo D**. The pipe connected the light fixture to the top of the harp. Next, I slipped one of the rubber plugs that came with the kit over the pipe to hide the exposed threads. Also included in the kit was a nice-looking gold piece with a hole in the center that was referred to as a check ring. It's a little larger than a quarter, and it fits nicely over the soldered nut on the top. I used the check ring to hide the soldering job on the nut.

You could probably make the lamp by going into any good lamp department and just buying what you need. One of the things the lamp kit gives you is a light fixture with a small hole on the bottom for the line cord to pass through. If you just buy a regular light fixture, the wire passes out the bottom through the threaded insert, and in the case of a regular lamp it finally goes out the bottom of the base. If you don't buy the kit, you will have to drill a small hole and add a small rubber grommet. I found a large selection of

Continued on page 30

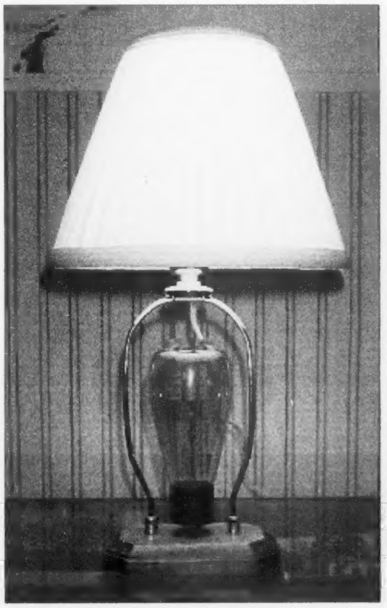

Photo F. *The completed lamp.*

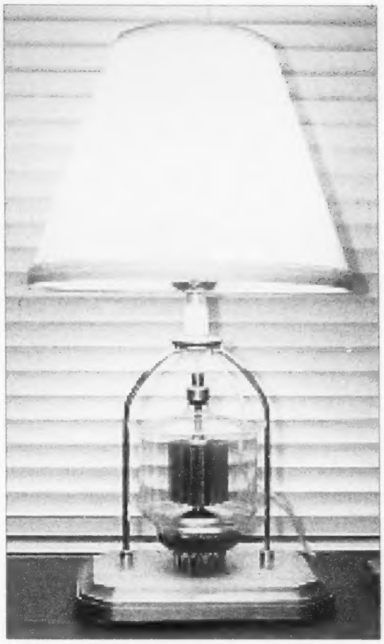

Photo G. *Lamp made from a 3-500Z.*

Photo H. *Lamp made from an 814 tube.*

ON THE AIR
DANGER
HIGH VOLTAGE

Photo I. *The author's shack is well lit in more ways than one.*

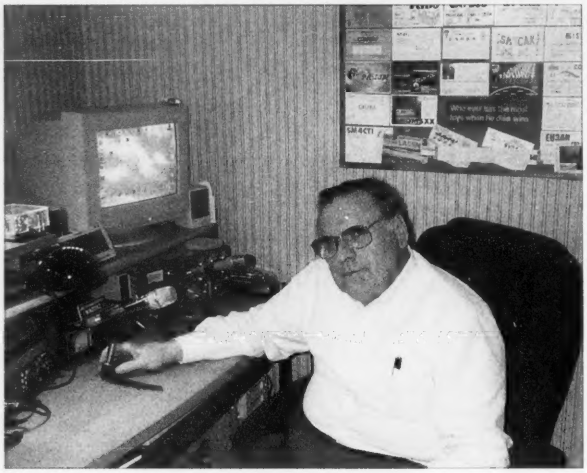

Photo J. *WA2OKZ.*

Lamps from Tubes

continued from page 29

Angelo kits and accessories at Home Depot and Ace Hardware.

Harps come in different sizes of lengths and widths — get the dimensions of the tube that you want to use before you go to buy the parts. I also bought extra brass locknuts because they were larger than the one that came with the kit and I thought it would be easier to solder it to the top of the harp.

To complete the lamp, a lampshade is needed. The type of shade you need is the one that clips over the light bulb. I bought mine at a local Target store for about seven dollars.

My shack has three lamps. The lamp in **Photo G** was made from a 3-500Z and was the most interesting. I had to cut the harp where it bends. The other lamp, in **Photo H**, was made from an 814 tube that also gives a neat appearance.

Some helpful hints

When you are ready to mount your tube on a wooden base, visit your local craft shop. I got nice clean pine bases for anywhere from 50 cents to $1.50. When I was ready to drill the holes for the tube pins, I got a piece of carbon paper from one of the secretaries. I placed the tube on top of the carbon paper and gently pushed down, leaving nice marks where the pins were to go. I used an old piece of pine to drill out first so that I could get the diameter of the holes correct on the final piece.

Remember that you do not have to build your lamp exactly as I did. Take a chance if you see something a little different. You can't really lose anything. The parts are relatively cheap, and as long as you don't drop the tube, you can play all you want until you get the lamp to look the way you want.

Hardware

As I said earlier, I found Angelo Brothers by accident. The company is located at 12401 McNulty Road, Philadelphia PA 19154. When I considered writing this article, I wanted to make sure that the parts would be available. I sent E-mail and inquired if they sold direct. I was told that if I wanted a local distributor, I should call (800) 999-2226. Their Web site is at [www.angelobrothers.com].

The kit that I purchased was their part number 70015, "Make-A-Lamp Kit for Bottles." The kit contains the on-off light socket with a line cord, a set of bottle adapters, which plug into the mouth of the bottle, a steel nipple, a locknut, and a check ring.

Part number 70220 is an 8-inch two-piece detachable lamp harp. I added a package of four brass locknuts, 1/8 IP thread, Angelo part number 70620, and an 8-piece assorted 1/8 IP threaded steel nipple, number 70150.

The bottle kit, the harp, a block of wood, a light bulb, the lampshade, and your favorite tube is all that you will need.

What did it cost?

These lamps are all unique. If you have a collection of old tubes, you can make some nice gifts. The lamp kit is less than $6, and the price of a harp about $2.

Add some extra nuts and some extra threaded pipe and you're in the $12 range. If you have to buy the base, we're talking of another $1.50, tops. The most expensive single item was the lampshade at $7. You should be able to keep the final cost under $20.

I know that there are many talented people out there who will figure out a better way to make tube lamps, or maybe even a better way to display these relics of the past. When you finish your lamp, please E-mail me a picture.

I hope you have as much fun as I have had in building these lamps. They go together quickly. So even if you don't need more than one, you can give the rest away as gifts. 73

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Jim Bassett W1RO/7
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LOPs to Think About

Come aboard for a great surplus find.

Navy CW started out with its own operating style and furniture. Quite a while ago, I was looking for an old U.S. Navy shipboard CW operating table to possibly add to my ham shack. Having been a Navy radioman for 20 years, I'd stacked lots of stuff on top of these old tables. I thought it would be practical for stacking equipment while still allowing me the freedom to operate below the equipment.

Where to start? My first order of business was to research where one of these tables could be located. Since there are several Navy salvage yards around the world, it would not be easy to check the catalogs of each one every month until such a table appeared. The Internet provided no leads at all. The local library was no better.

Next choice was *QST*. Yep, I sent in a Stray looking for information from anyone about such a table. The day before I received my *QST* in Nevada, my phone rang with the first touch of information. A ham in Maine called me to tell me he might be able to get a copy of the U.S. Navy blueprints for me so I could have one built. Wow, what a break! It seems he had been a shipyard worker there in Maine and knew exactly what I was talking about. Within a week, a copy of the plans arrived. The official Radio Operating Desk Plans are now in my ham shack.

Within a week of *QST* hitting the western states, my E-mail was flooded with all kinds of offers of information about this desk. Sailors or former sailors all over the country were sending me E-mail, cards, and letters. Some told me about their experiences during various wars. Some sent pictures of Navy and Coast Guard operators either sending or copying code. It was like a floodgate had opened for about a month. The E-mail that topped it off came from San Diego, California. "I've got one of those LOPs (Local Operating Positions, as the Navy called them) that's been in my garage for 30 years. If you want it, come get it." Paydirt!

After a few E-mail exchanges, it was determined that this was exactly what I was looking for. In March 2000, I combined a business trip with a pickup of this great little desk.

The story, as I have it, goes like this. The desk was LOP #1 on the USS *Bunker Hill* CV-17, decommissioned in 1947. Apparently it had been acquired and moved to this garage to serve in his ham shack. Others I've

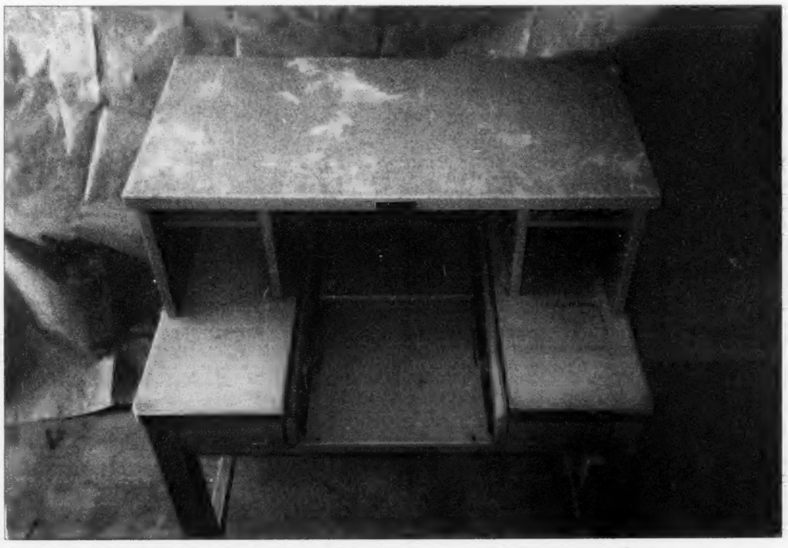

Photo A. *This is the condition the table was in upon arrival at its new home.*

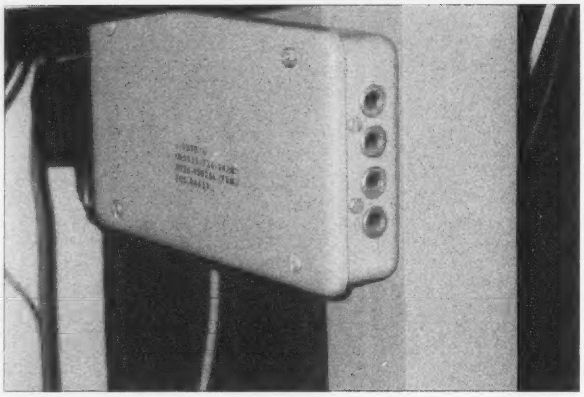

Photo B. *The headphone jack box is located on the right table leg.*

talked with tell me that this ship, although decommissioned, had been used as a test bed for various projects in San Diego for many years.

Nonetheless, the table ends up in my trailer and heads up interstate 15 to Las Vegas, Nevada, and its new home.

First stop is in the garage for cleanup and possibly to be refurbished. Seeing how it had been in a seaside community garage for 30 years, it had obvious green stuff growing on the drawer handles, and the paint on top would need to be replaced. The green linoleum, used for the desktop, needed to be cleaned or replaced, as it had tape residue and was covered with years of use. The wiring had to be checked and tested.

First I had to match the paint as closely to the original as possible. The Nevada desert obviously doesn't have a Navy supply store anywhere handy and I wanted to make sure the paint was exactly the same color. The solution was a simple trip to the local hardware store with one of the small shelves from the desk for them to match. They put the shelf under the spectrograph and within minutes we had a match.

Let's see, we have the desk, paint, electric drill with wire brush, spray painter, multimeter, paint remover, roll of plastic dropcloth, screwdriver, wrench, Pine Sol®, brown paper with masking tape, and a garage to hold it all during the project.

Next step is to clean it up to see what we are working with. Pine Sol the entire desk. Second, remove the top section from the desktop. With the two pieces separated, it will be easier to work with.

Working with the top section only, it was a matter of cleaning and scraping loose paint off. From the picture, **Photo A**, you can see the top has already lost some of its paint over the years. Having removed all the easy stuff, it was time for the paint remover for the very top shelf only. All the paint on the sides and supporting walls was left alone. Taking the top down to bare metal, prepping it, and then repainting it only took a couple of days. I painted the top section except for the back, which was in perfect condition (so I left it alone).

The lower desk portion looked like it was going to be a real job. The right side linoleum had some of the old cellulose tape remains imbedded into it. What to use? Well, when in doubt start with full strength Pine Sol and elbow

Photo C. *Table unassembled, taped, papered, and ready for painting.*

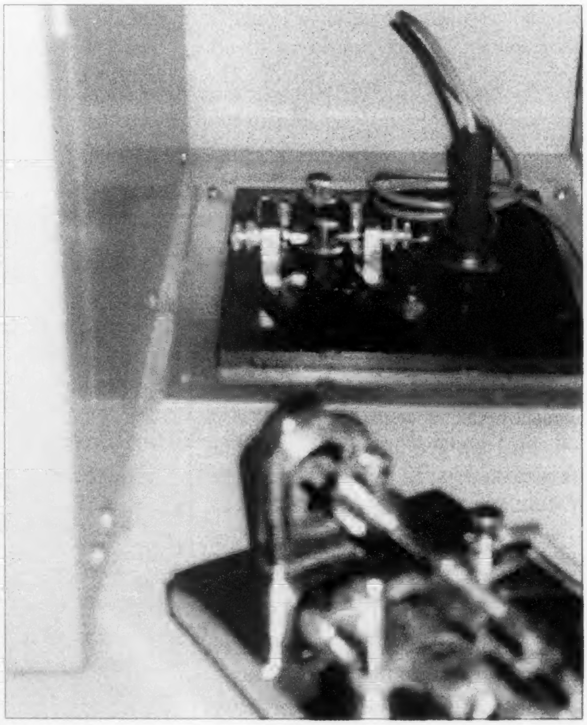

Photo D. *Reinstalled Bakelite control panel with USS* Mississinewa *straight key and bug plugged in.*

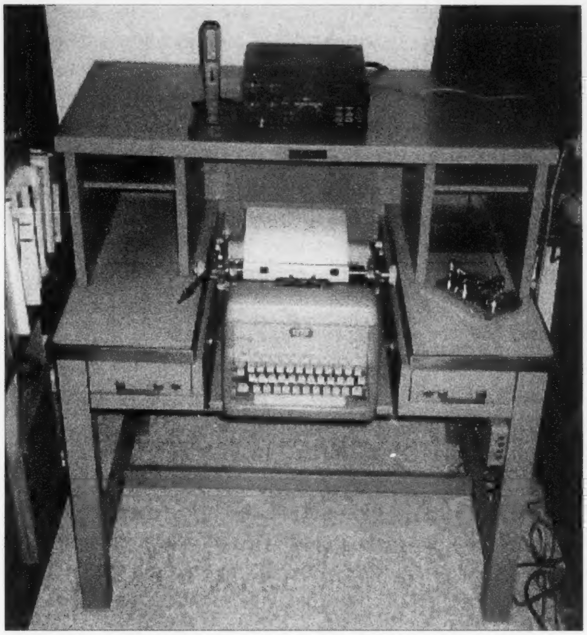

***Photo E.** Finished table with equipment installed in the radio shack.*

grease. Hey, what do you know? It worked. Both sides were cleaned the same way. Sometimes the tougher stains had to have the Pine Sol on them for 30 minutes or so, but it worked.

The handles of the drawers, being a nice moldy green color, were simply wire brushed using the electric drill with an adapter. The green flew off the handles. Inside the drawers was just a matter of scraping paint to smooth out previous scratches. Original models had an ashtray built into the left drawer. This drawer did not have one. I believe it was there originally. This desk, being from an aircraft carrier, also did not have the eyebolts for the strap on the legs. The strap was used to hold the operator's chair in place. It went from one leg, behind the chair and back to the leg on the other side. During high seas this kept the operator in front of the desk. The strap was a required item on destroyers and other ships accustomed to rocking and rolling at sea. The only other option was for the operators to wrap their legs around the legs of the desk to keep from moving.

After all the prep work was done, it was time to paint. As shown in **Photo C**, you can see paper and masking tape in place, dropcloth under every piece of equipment, spray gun in hand. Paint on the first coat was finished in 30 minutes. Then, next day, another 30 minutes of painting and it was nearly completed.

The Bakelite electrical panel/key mount (**Photo D**), which was removed prior to painting, was verified to be in working order, with the exception of the On/Off switch. This was not required, so it was not rewired. It was used to remove high voltages from the key when not in use. Clean the Bakelite with good ol' Pine Sol. Use contact cleaner to shine up the electrical working parts and the speed key jack. Headphone jacks mounted on the leg of the desk (**Photo B**), worked perfectly. Interesting to note: Upon opening the headphone jack box the insides looked brand-new. The only addition to the wiring was a plug to fit into the back of the radio speaker jack. It was necessary to replace the straight key that was not the original, with a key from the USS *Mississinewa,* AO-144. In 1970, while I served on the USS *Mississinewa,* the CW desks in radio two, the transmitter room, were being removed and thrown over the side into the Mediterranean. The First Class Radioman in charge of the project asked me if I wanted the key. Of course I did. I was going to get my ham license someday. Now the key has a good home.

After finishing the painting and wiring, I moved the two pieces of the desk to an upstairs ham shack. The desk was too large to fit through the door in one piece. We had to turn the bottom section on its side to fit through the door. Once inside the shack, it was reassembled using all necessary hardware (**Photo E**). The miracle came

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when every nut, bolt, and screw was back in place, with no extras and no holes left unfilled.

You'll note only one radio in the picture at this time. That is because it was the only gray radio in the shack. The bug in the picture is from 1979 and has not seen naval service. I also use a 1964 Champion the Navy gave me, complete with Navy stock number imprinted on the base.

The typewriter is a communication mill, all capital letters. It was acquired using the same research method. A Stray in *QST* produced another flood of E-mail, letters, and cards. I had mills offered to me for fair amounts of money all the way down to this one — free, just pay the shipping from Florida. To my surprise, this Royal is the same model I used on active duty in the '60s aboard ship. It is sitting on a sliding shelf. This sliding shelf allows the operator to pull it to him for ease of use, or push it all the way to the back. With the mill pushed all the way to the back, the operator could pull down a folded cover to make a small, flat desktop in the front. I do not have this cover, yet. The slots that hold the shelf needed to be cleaned out and sprayed with a light lubricant. To keep the mill shelf from coming completely out of the table, there are two lever locks located 6-1/2 inches in from the front edge on either side that contact the stops mounted on the rear of the shelf.

Although this desk is over 50 years old, it came back to life very easily. There is one other type of CW table used by the Navy that allows the mill to disappear into a well area, giving the operator a flat desktop working surface all the way to the back of table. Other changes to today's table are that the top section is not installed and the key is a covered, explosion-proof design. This type was still in use in the Navy as of 1988, when I left the service. Either table would make a nice addition to the ham shack.

This unit is of aluminum, but you could construct one of wood also. Aluminum was used to keep the weight down and because it is a nonburnable substance.

The idea of mounting the headphone jacks on the leg of the table is more convenient than having a cable running across the top of the desk you are using to copy code. Yes, it works well for listening to SSB nets, and copying traffic as well. Using multiple jacks allows for friends to listen in without disturbing the rest of the nonhams in the house. A multijack box is a good idea for Field Day when using another person for logging.

The key being mounted in the cubbyhole allows the operator to have the entire forearm on the desktop to reduce fatigue. It proved to be useful on SKN 2000. There is enough room to slide the bug into the cubbyhole but the forearm is not complete up on the desktop. Bug operators are not as concerned with the glass arm complex.

This has been one of those projects

Continued on page 57

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The Saga of Archie and Tillie

... otherwise known as Elmer.

As do many of us, I sometimes reach back into my past to reminisce about events having significant meaning in my life. Often I've thought of the man and woman who gave to me the opportunity to begin my lifelong career. Archie and Tillie were my "Elmers," though I didn't know that at the time.

Let me tell you of how my life was affected by my "Elmers," and then imagine for yourself how your assisting future amateurs could begin endless adventures for them.

In the late 1950s, a teenager's life in a rural community wasn't exactly filled with available technical opportunity. Or if it was, I sure didn't know that it was out there! One of the most intriguing events for me during those years was a visit to my grandparents' house, and that upright Philco in the living room. I would spend hours listening to stations from "who knows where," daydreaming all the time of what it was like to be able to understand what all those noises meant.

The summer of 1957 arrived, school had been successfully accomplished for one more year, and the lazy days of summer were the order of the day. But not for long!

Up the road from our place is a small summer camp that was commonly referred to as "The German Camp." Nobody paid them much mind: They were quiet folk, remaining very much apart from the happenings in our community. The only noticeable event happening with the lodge was the rattling of the lodge station wagon delivering passengers from the train station on Saturday morning to the lodge, and returning them to the station on Sunday evening. When I asked my parents about these people, they informed me that they were "city folk" looking for some relaxation, and that I was to "leave them alone."

Needless to say, this guidance, while being "heard," wasn't a complete explanation of the question! Once, while walking past the place, the people outside were relaxing and chatting, but I couldn't understand what they were saying. The German language wasn't spoken in our household.

Family visits to the grandparents on a weekend evening were often a memorable occasion. The living room held great fascination for me, and the upright allband radio there intrigued me for hours. I would sit and listen to strange signals emanating from the speaker, wondering what magic created them, where it came from and what it meant. This would go on until the adults decided that they had heard enough noise, and that the unit would have to be "silenced."

Rats!

Passing the lodge one summer's day, I again heard the sounds of radio communication from one of the buildings. Antennas were strung through the trees, with coax leading into the building. The door was propped open, allowing the summer heat to escape and thereby letting the sounds be heard outside.

It was more than an inquisitive teen could endure. Summoning inner courage and ignoring the instructions of my parents, I approached the "forbidden" and knocked at the open door.

"Ja, may I help you?" came the reply from within.

Words "stuck" in my throat, but I managed to say, "I want to see your radio, please."

And with that a friendship was begun which has lasted for years. I introduced myself, told about the radio at my grandparents, and how there wasn't anything like that around here for my interests.

Archie proceeded to show me his vintage converted wartime radio, now operating on "ham" frequencies. He questioned me about what I had wanted of him, and what I thought I would like to do in the future. I'm sure he knew all along what the "lure" of signals and glowing tubes meant to a "budding" mind, but he was patiently setting the stage for my entry into the world of electronics.

"Ja, I gif to you von hour on Saturdays, ven I em here. You sveep my valk, shovel snow ven vinter comes," he stated with his German accent. "You study hard ! No fool around. Ven you are ready, I gif to you the test. Ven you haf ticket, you promise to teach others who come along. Ja, is good?" he spoke very seriously.

I could hardly believe my ears! I'm going to be a radio amateur, with a license and everything! WOW!

I promised to teach when I was able, not fully understanding what that commitment would require, but at that time I would have agreed to almost anything.

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Archie was writing a copy of the Morse code for me on paper as my first lesson, when his wife Matilda (Tillie), appeared from the main house. Archie introduced us and explained to Tillie why I was there. Tillie smiled, wished me welcome to their weekend home, and wished me luck in my studies.

The days of the week passed slowly while I studied the code and other material Archie had given me. Days were far too long, waiting for the "toot" of the horn from the ancient station wagon passing our house. That was the signal that Archie and Tillie had once again arrived for the weekend.

Finally, the day of reckoning had arrived! Those were the days when the Novice exam was given by mail — provided of course, that you could find an amateur willing to send for the materials and administer the test. The examination papers had arrived. I presented myself to Archie to test whether the time had been well spent or not. I need not have worried!

It took weeks for the Bureau to process applications. I had almost forgotten (yeah, right!), almost given up hope for a passing score, when my mother called to me from the kitchen.

"You've got a letter here. It's from the FCC," she said.

With trembling fingers I opened the small white envelope. Not knowing exactly what to expect, I read the document over and over again.

"Hey, I passed!" I exclaimed.

My Novice call was KN2UZF, good for one year, 75 watts maximum, etc., etc. I was elated beyond belief! I didn't have a radio, nor antenna, nor money to buy one, but I was a "ham"!

Since that wonderful day much has happened in my life because an old man and his wife gave of themselves to an inquisitive teenager. Shortly after gaining my "ticket," Dad was ordained into the ministry. This required that we move to another town. The promise I had made lingered with me as we settled into our new community.

As with many a young man, with the completion of schooling, I elected to "join the Navy and see the world." I just had to see what the world had to offer. And wouldn't you know it, one of the tests given at basic training was Morse code! It was a breeze to pass that one! And with Amateur Radio Operator's License listed on the background forms, doors opened to a field called "Cryptologic Technician." I hadn't any idea what that was, but then neither did the person assigning me to the schooling!

As it turned out, four years of Secret stuff being a Radio Operator was terrific! Still wondering what the world was all about, I enlisted in the Air Force. The offer of a yearlong school for Basic Electronics through Advanced Circuitry was hard to dismiss. My amateur license, together with "crypto" experience (which they couldn't equate to anything) ensured my selection.

Twenty years of military service later, I finally retired. Not wanting to be unemployed, I applied for work with "Ma Bell." Yes, they had a position for me, but the starting pay would have to be increased, considering all your training and all!

More money! Oh, well, if I have to take it, I guess I will.

That lasted for 17 more years, until the offer was made for early retirement. Now I work at West Point, the U.S. Military Academy, where I repair equipment used for cadet training.

The promise made to Archie hasn't been forgotten. Now I perform VE services at testing sessions, give demos of homebrew QRP gear, help new hams to get their "kit" projects up and running, etc. Whenever I'm asked for assistance, I hear Archie's voice saying:

"Ja, you teach all who come along, remember."

Yes Archie, I haven't forgotten. And so I teach. Some are young minds, filled with awe; some are not so young, looking for inspiration and challenge. Never mind — they all receive the same "hour" given to me so long ago.

Thanks, Archie K2ANB (SK)! Thanks, Tillie K2AUM (SK)! Without your help, who can tell where the minister's kid would have gone? Thanks for a wonderful start on a life's adventure.

Got an Elmer or two you'd like to thank? Let us know at 73. *— Ed.*

Bill Boas KC0IZI
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QRP Internet Computing

Fast, powerful, secure ...

For the last 20 years, ham radio, personal computers, and the Internet have been running along parallel circuits that sometimes miss or forget important connections.

What's been overlooked, or forgotten, is that it doesn't take a high-powered, Microsoft-Windows–based computer to easily and speedily access today's Internet, E-mail, and World Wide Web with its wealth of information for the ham community. Any older DOS-based 8088, 286, 386, or 486 computer will do it all — and very quickly.

For example, I'm writing this with a 1984 Compaq portable, running an 8088 CPU at 4.7 MHz, and an ASCII text editor of only 3116 bytes. It has 256Kb of memory, no hard drive, two low-density 5.25-inch 360Kb floppy drives, and an internal 2400 baud modem. It's operating from one floppy containing system files of MS-DOS 3.3, the little editor, and a dial-up communications program.

When I finish the story, I will use this machine to log on the Internet, check my E-mail, visit some regular Web sites, and then E-mail this story to *73* magazine. It's "QRP Computing" at its best.

To put your old DOS computer back on-line, find an independent Internet Service Provider (ISP) who is able and willing to provide you with a UNIX or LINUX "shell" account. Shell accounts are a legacy of the early Internet and the 32-year-old UNIX operating system. LINUX, developed in 1991, is a PC and MAC clone of UNIX. LINUX's recent popularity as an Internet server almost guarantees that your local community has an ISP willing to set you up.

Using a shell account is like dialing into a BBS of the 1980s, where you use the keyboard not the mouse. You need to brush up on, or learn, some elementary DOS and a few simple LINUX commands to earn your way to an Internet ticket for that old computer you were about to trash.

The benefits are significant.

By dialing into a shell account, any computer becomes a remote terminal to the LINUX server, and isn't directly connected, or vulnerable, to the Internet. This means you're protected from direct attack by computer viruses. That applies to "cookies" and other hidden "temporary Internet files" as well, since they never reach your computer — only the server — which automatically deletes them when you log off.

A LINUX server between you and the Internet is a formidable privacy and security firewall. However, when you download files or programs to your own computer, you need to take the usual security precautions.

One of the best things about a LINUX or UNIX shell account for the Internet is that it's all text, with no intruding graphics or advertising banners popping up during your on-line session.

The text-only Internet is very fast. For hams looking up on-line callsign information, or accessing the ARRL, QRZ, or other amateur radio Web sites, the World Wide Web's graphics often just get in the way of the essential information you're seeking.

This 17-year old Compaq is often faster at retrieving text information from most Web sites than my friend's Pentium 300MHz machine with a 56Kb modem pushing graphics through Windows 95 via America Online. Once connected to an ISP's LINUX server, performance primarily depends on the speed of your modem — not CPU. However, most people can't read text faster than just what a 2400

Continued on page 58

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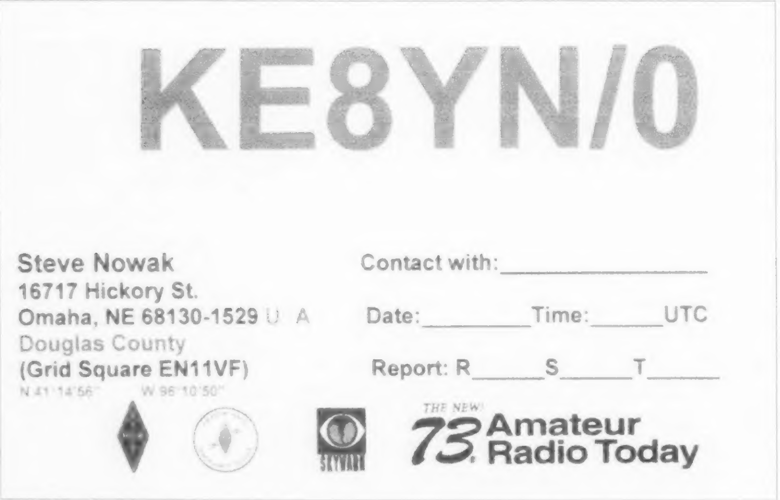
Inkjet QSLs the Easy Way

Basic techniques for basic cards.

Ham radio is not just a hobby, but more like a whole collection of hobbies. This means that when one part of the hobby loses a little of its novelty, you can play with a different area. Tired of chatting on the local repeater? Maybe you should work a contest or two, or maybe build some accessories to make life easier in the shack.

In my case, for example, since I tend to concentrate most of my hobby time on public service and disaster communications, chasing DX is not my most common area of involvement. I do enjoy spending time on the low bands, but other duties, kids, etc., compete for the available time. When I do find the time, though, I enjoy it greatly, but often have a slight problem with a lack of QSL cards even though I do believe that a QSL card is the final courtesy of a good operator. Add to that the fact that my day jobs have involved frequent moves and it should be no surprise that I do not always have up-to-date QSL cards available. Although over the years I have used my share of stock cards, I admit I prefer to have something just a little different. I have made various efforts to design my own card, although being artistically challenged it takes more than a bit of effort.



KE8YN/0

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Fig. 1. *My basic QSL card for contacts made from the home QTH as designed on my computer. I like to have all of the information on the front of the card so if the other operator mounts cards on the wall, it doesn't have to be moved to read the contact information. If you enter your information by hand, a "Sharpie" type permanent marker works particularly well.*

When I've had to move or there has been some other change, I've tried to save a few bucks and use up my stock of existing cards by placing stickers over the incorrect information. This is less than optimal, especially for someone like me who has kept his old call and has cards with a /5 and /4 to indicate my (current) home QTH. I hate the idea of throwing out a couple hundred perfectly good, albeit incorrect, QSL cards when busily packing for a move.

On the other hand, I do believe that a QSL card should be accurate. Yes, I've used postcards and other substitutes, but I've always been less than pleased with this approach. Besides, being a cheapskate I realize that postcards are one of the more expensive methods of confirming a contact. The fact of the matter is that I eventually had to admit that I need QSL cards on an occasional basis rather than stacks of them on a regular basis. I knew there had to be a better way than to throw away a couple of hundred old cards and order a thousand new cards each time I moved.

I had tried a few methods of generating QSL cards on my computer in the past but was less than thrilled with the results. In some cases I was satisfied with the design but not satisfied with my ability to produce them on anything heavier than typing paper. I tried copying the results onto card stock by use of a photocopier. This seemed fairly economical but I was limited to a single color (black) for the type and any graphics or illustrations I wished to include, although I could use a variety of colored papers to make the cards more interesting.

When I got a color printer I explored the idea of printing cards in color. While this might not be the most advantageous method for people who are big-time contesters, the price of ink is relatively reasonable (especially if you refill your own cartridges) if you only plan on printing small quantities. I had one major problem, though, in that I had a very low success rate in getting the cards cut to the size that I wished. For some reason, my ten matched thumbs ensured that the cards would be cut uneven, misaligned, or in some other manner less than acceptable. My elementary school teachers were never able to adequately correct my deficiencies in penmanship or my ability to cut and paste correctly.

Like many of the great ideas I've had, the one for the computer-generated cards was shelved on several occasions. Instead, periodically I bit the bullet and sent an order off for another stack of cards, many of which found their way into the trash rather than into the mail.

I suspect that many other hams are in a similar situation. We are a particularly mobile society, with many of us enduring moves as a part of our career path. Then there are those who have decided to take advantage of the vanity call system and have changed callsigns. Finally, with the restructuring of the ham radio license system, many of us upgraded in the past year, including some who elected to change their callsign to reflect their new status.

This year, as the bands opened up I began working more DX stations, particularly from the car. I began to think of how neat it would be to not only replenish the stock of QSL cards but also to have some special QSL cards specifically for mobile operations. Like most hams, practicality is not my defining virtue, but even I had to admit that this presented a few problems. If a minimum order of cards lasts me for quite some time, then a double order would indeed represent overkill. The idea of using the computer to generate the cards once again seemed to be worth entertaining.

While visiting that great American institution (Wal-Mart), I came across a possible approach that might meet my needs. In the stationery aisle was a product labeled "Glossy Photo Quality Postcards for Ink Jet Printers." This product, manufactured by Avery labels (product number 3248) included ten sheets, each of which could be used to print two post cards. The sheets were perforated so that once the printing was completed, the cards could be easily separated. Since the cards included a border that extended beyond the card edge itself, if desired I could print all the way to the edge of the card. The package also included twenty envelopes. I prefer to use envelopes for direct mail in most cases to keep the cards as neat as possible. Since inkjet-printed cards would not be waterproof, this seemed especially important to ensure that the cards arrived in acceptable fashion.

I took the package home and began to play around with various ideas. I mentally sketched an idea as to what I wished to include. Since I tend to write my columns and articles in my mind, this is my preferred approach, but more practical people may want to jot their ideas down on a sheet of paper. I blatantly stole ideas from the QSL cards I've received over the years, picking and choosing the best of other people's ideas. Here are some of the items that I considered:

1. General layout. I like to have

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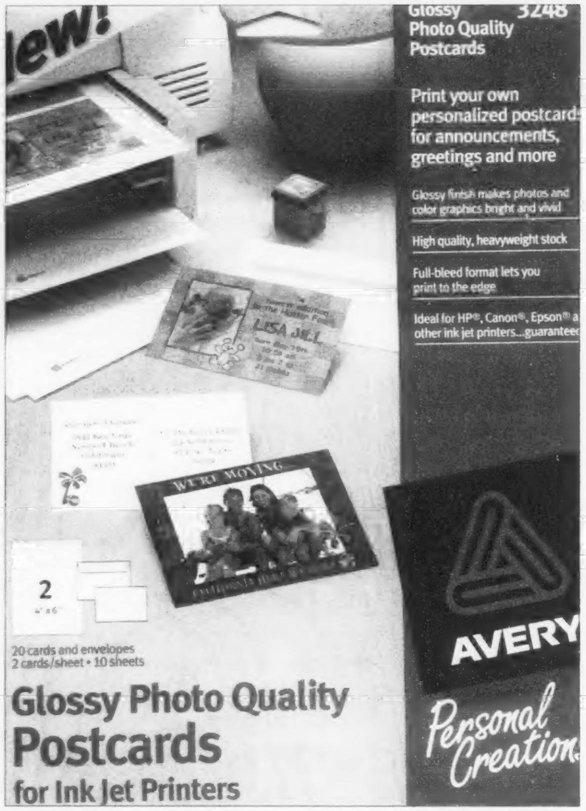
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2 cards/sheet • 10 sheets
Glossy Photo Quality Postcards for Ink Jet Printers
AVERY
Personal Creations

Photo A. Avery's Glossy Photo Quality Postcards for Ink Jet Printers.

everything on the front of the card so that the information can be read if the card is tacked to a wall. This also leaves the back free for comments or a personal note to the other operator.

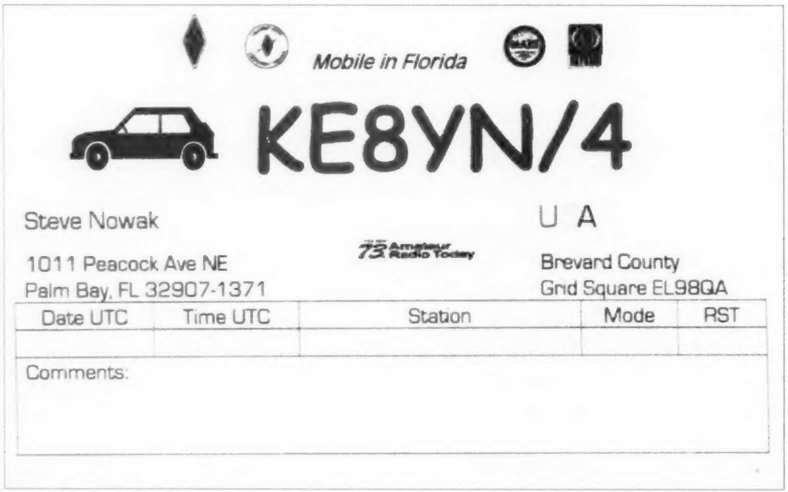
2. Callsign. Although I like graphics, I prefer that the callsign be the most prominent feature of the QSL card. To me the callsign is the key feature, since it defines who I am on the air. Like many hams, people with whom I talk on a regular basis could pass me on the street without knowing who I was. My face and name may not be important, but to other hams my callsign sure is. In my case, since I have chosen to keep the same call I've had for a number of years, I like to indicate the callsign area in which I am currently living, so I want my cards to read KE8YN/4.

3. Demographic information. While this may seem obvious, it's a good idea to make a list as to what information you are going to include. Obviously name and address are important, but don't forget to include your country! I also include the county (or parish or borough) and my grid square since some hams focus on working stations based on these. If you don't know your grid square, you can find it by getting a maidenhead map, or by looking up your own callsign on [http://www.qrz.com].

4. Logos. Are you active in ARES or RACES? How about MARS or SKYWARN? Maybe there's a significant nonham interest you have such as Scouting. If so, you can add the appropriate logos to your card to make it more personal. While you may choose to scan these in yourself, a little bit of Web surfing may save you some time. The league's Web page [http://www.arrl.org] has a section for logos and pictures relevant to the ARRL. Check the Web pages relating to your favorite activity to see if they have the logo you seek. If you place the cursor on the picture and press the right mouse button, you should see a dialogue box with one choice being "Save Picture As." Scroll down to that choice and click the left mouse button. This will let you save the picture as a file that you can insert into your QSL card later.

5. Other graphics. If you or a family member is artistically inclined, you can use a scanner to import a sketch, drawing, photo, or other art form and incorporate it into your design. Digital cameras have become quite reasonable, and for small-size pictures even the basic ones can provide a satisfactory image. While standard photographs can be scanned, the digital photograph can be directly imported into the design. Incidentally, many word processing or other programs have a selection of "clip art" pictures included, and you can purchase CD-ROMs of clip art very reasonably at office supply stores, discount stores, etc. You may find the graphic you seek in these locations.

6. Contact information. You'll need to include space for the other station's callsign, their signal report, and of course the date and time of the contact. Some people like this in a table or box format, others as a fill-in-the-blank.



Mobile in Florida

KE8YN/4

Steve Nowak

1011 Peacock Ave NE
Palm Bay, FL 32907-1371

73 Amateur Radio Today

U A

Brevard County
Grid Square EL98QA

Date UTC	Time UTC	Station	Mode	RST

Comments:

Fig. 2. Since much of the time the only DX time I get is when I'm on the road, it only seemed appropriate to have a separate card for mobile operations. For this card I used a table to format the contact information. The large comments box is to remind me to always add a brief personal note.

7. Station information. You may want to include a description of your station equipment. We hams all love to compare our toys, so the type of rig you're using or the specifics of the antenna can be important, or at least interesting. If you're only printing a few cards at a time, it is very easy to change the station description if you change equipment.

8. Comments. I often like to write a few words to the other ham, so a space for comments is helpful.

There are many computer programs that can be used to develop your QSL cards, but I decided to use a word processing program since these are so common. Many computers come preloaded with Microsoft Office, so I decided to use Word, Microsoft's word processing program. If you use a different word processor, most of the procedures I describe will be similar. The one advantage of Microsoft Word is that Avery makes a software add-on for Word called Avery Label Wizard that can be downloaded at no charge from their Web site [http://www.avery.com]. There are multiple versions available, so make sure that you choose the one appropriate for your version of Microsoft Word.

The downloaded file is self-extracting. Once it is run, the Avery Label Wizard becomes a choice in the Tools menu of Microsoft Word and formats your work to fit the size and shape of the card. In some versions, the #3248 card is not shown on the list of supported formats. Instead, choose product number 8389, which is the exact same product as it is packaged and sold without the envelopes.

If you do not use the Avery Label Wizard, there are several other methods to use to properly format your QSL card. Enclosed in the package with the card stock is a page that has the borders and margins indicated. This can be used to set up your particular program to print properly on the card stock. It may be useful to make a couple of extra copies of this page so that you can test your layout once it is completed. I have found that in some cases the printer may see some things slightly different than the view on the screen, and extra copies will allow you to tweak the layout to make sure that it is just perfect.

The directions that come with the cards recommend that you set the page up as a table. This works out pretty well for many people in most postcard applications. If you want to have a table or box for the station, date, time, and signal report, I recommend that you not choose this option. I have yet to find a way to permit me to put a table inside another table. It probably is possible, but if it takes too many steps, I just tend to look for an easier and more logical approach.

In my case, I decided to set up a page which matched the layout of one of the two cards on the sheet. I figured that I could print one card, reverse the form, and then feed the other end through the printer. In this way, if I wish to customize the card with equipment information or type in the contact information, I can print each card separately. In order to do this, I initially set the left, right, and top margins at 1.25 inches and the bottom margin at 5.75 inches. After printing a test I realized that I would have to modify the margins slightly, which is why the test page can be so useful. In my case all of the margins needed to be readjusted except for the bottom one. The large bottom margin is actually the second card, of course, but that causes the card stock to be ejected by the printer when the top card is done printing.

One of the things I like about this approach is that I can make changes between the two cards, such as one for a mobile card and the other for confirmation with my fixed station. If I save the basic layout of the card as a template, I can type in the actual contact information or specify which equipment was used for that particular contact. On the other hand, if you run more than two cards at a time, particularly if you plan on filling in information with a pen, you may wish to take a slightly different approach and the Label Wizard may be the best bet.

As I mentioned, I do like the fact that the Avery cards come with envelopes, which helps ensure the delivery of a cleaner card to the other station. It would be possible, of course, to design a postal card format for the other side and mail the card at the lower postal rate. If you are using the card for DX confirmation, though, and send your cards through the ARRL's outgoing QSL bureau, the envelope would not be essential. For same-country use, and if you are really ambitious, you might elect to take the process one step further and use the computer to address and even embellish the envelope. You might choose to add a graphic or a statement about ham radio to the return address. If your handwriting is as notoriously bad as mine is, you may wish to offer the postal service a legible address for a better chance at delivery. I recommend using the bar code printer to add the ZIP code of the recipient, since this will allow the envelope to be routed most quickly. If your software doesn't offer this, the post office system will usually read a typed envelope and add the bar code as it is being sorted, but I figure that every step I can handle myself is usually better.

While using this technique was inspired by the need to make a relatively small number of QSL cards, even active operators may want to design their own cards and then forward them to a printer. I've been told that printing QSL cards is somewhat of a specialty, so you may be advised to pick your printer with care. Many QSL printers are ham radio operators themselves, so they understand what a QSL card is and how we use them. Keep in mind that multicolor QSL cards can be significantly more expensive than single-color cards.

I recently found a printer that will print 200 cards for only $17. If you do, you may need to modify the margins just a bit, since standard printed QSL cards are three and a half inches by five and a half inches, just slightly smaller than the Avery cards. You might consider designing your own card and having a quantity printed in a single color from your design, but for special contacts printing up a full-color version of the card.

Hopefully these ideas will be helpful to you. If we meet on the air and I talked you into designing your own card, make a note on the card when you send it! 73

CALENDAR EVENTS

Listings are free of charge as space permits. Please send us your Calendar Event two months in advance of the issue you want it to appear in. For example, if you want it to appear in the May issue, we should receive it by February 28. Provide a clear, concise summary of the essential details about your Calendar Event.

FEB 3

LORAIN, OH The Northern Ohio ARS will sponsor Winterfest 2002 at Gargus Hall, 1965 N. Ridge Rd., Lorain OH, 8 a.m.–1 p.m. Directions from the East — Take I-90 or the Ohio Turnpike West to the Rt. 57 exit. Go north on Rt. 57 to the first light and turn left. Get in the right lane. The hall is on the right side about a half mile down. It is after the first light and right before Marco's Pizza. Directions from the West — Take I-90 or the Ohio Turnpike East to the Rt. 57 exit. Go north on Rt. 57 to the first light and turn left. Get in the right lane. The hall is on the right hand side about a half mile down. It is after the first light and right before Marco's Pizza. From the South — Many routes cross Rt. 57. Take 57 North through Elyria. Turn right when 57 goes north to Lorain. Pass the turnpike and I-90 to the first light past I-90 and turn left. Get in the right lane. The hall is on the right hand side about a half mile down. It is after the first light and right before Marco's Pizza. Free pancake breakfast. Talk-in on NOARS rptrs. 146.700(-) and 444.800(+). Ample all indoor commercial space, reservations required. Tickets $5 each at the door; includes 1 admission and 1 breakfast. Breakfast will be served from 8 a.m. until 11 a.m. only. 6 ft. tables are $10 each. All workers require an admission ticket. Set up for vendors begins at 6 a.m., doors open to the general public at 8 a.m. For info contact *John Schaaf K8JWS* at *216-696-5709,* or write *NOARS* via E-mail at *[noars@qsl.net]*, or write to *NOARS Winterfest, P.O. Box 432, Elyria OH 44036-0432.*

FEB 4

SUN CITY, AZ The West Valley ARC will present an Amateur Radio Equipment Auction at St. Clement of Rome Catholic Church Social Hall, 15800 Del Webb Blvd., Sun City AZ (1/2 mile south of Bell Rd.). Free admission. The Club keeps 10% on equipment sales. Talk-in on 147.30(+). Contact *Jerry W9JIF* at *623-214-8136,* or E-mail *[w9jif@juno.com].*

FEB 9, 10

MEMPHIS, TN "Dixiefest 2002" will be held at the Shelby County Bldg., MidSouth Fairgrounds, Memphis TN, Sat. 9 a.m.–5 p.m., Sun. 9 a.m.–2 p.m. A special forum will be conducted by Riley Hollingsworth, FCC Special Counsel for Amateur Radio Enforcement. Other forums will also be held. Dealer tables $40 ea. (up to two weeks before the event), $45 each the last two weeks. $50 Feb. 8–10. Flea market tables $20 ea., power costs extra. Setup Fri. night or Sat. morning. VE exams both days. Food available inside the building. More info at *[www.dixiefest.org]*, or call *Ben KU4AW* at *901-372-8031;* or *Melinda KE4DXN*, at *901-744-1737.*

FEB 10

RICHMOND, VA The Showplace, 3000 Mechanicsville Tpke., is the location for the Richmond Amateur Radio Telecommunications Society ARRL VA Section Convention/ Hamfest/Electronics show, "Frostfest 2002." National and local vendors. Major manufacturers. Flea market, forums. Handicapped accessible. Parking, refresh- ments. Talk-in on 146.88. Tickets $6. Online tickets and general info available at *[www.frostfest.com].* Special VIP tickets may be purchased before Jan. 21st for early admission and special entrance. To make reservations call *804-330-3165;* or write *Frostfest 2002, P.O. Box 14828, Richmond VA 23221-0828.* For general info call *804-790-0077 opt 4.*

FEB 23

LaPORTE, IN The LaPorte ARC Cabin Fever Hamfest will be held at LaPorte Civic Auditorium, 1001 Ridge St., 7 a.m.–1 p.m. Chicago time. Admission $5, tables $10. Talk-in on 146.52 and 146.61(-) PL 131.8. Contact *Neil Straub WZ9N, P.O. Box 30, LaPorte IN 46352,* phone *219-324-7525.* E-mail *[nstraub@worldkey.net].* The club Web site is *[www.geocities.com/K9JSI/].*

MILTON, VT The Northern Vermont Winter Hamfest and ARRL Vermont State Convention will be held at Milton High School, Route 7 in Milton, 5 miles north of I-89 Exit 17. Sponsored by the Radio Amateurs of Northern Vermont, this event will be held 8 a.m.–1 p.m. Features include a flea market, dealers, book sales, forums, demonstrations, and refreshments. VE exams will be given at 9 a.m. and 1 p.m. Commercial exams begin at 1 p.m. Admission is $3, free for under 18 years. Tables are free while they last. Call for large setups. Check the Web site for the forum schedule and vendor setup info *[http://www.ranv.org].* Talk-in on 145.15 rptr. Bulletins on 146.67. Contact *W1SJ* at *802-879-6589,* E-mail *[w1sj@arrl.net].*

MAR 2

CAVE CITY, KY The 26th annual Mammoth Cave ARC Hamfest will be held Sat., March 2nd, 7:30 a.m.–2 p.m. CST, at Cave City Convention Center (I-65, Exit 53). Admission $6, tables $7. Tailgating, ARRL forums, Bingo, 3.960 MHz meeting. VE exams at 9 a.m. Contact *Jim Erskine KD4GNN, [mail@chirotoons.com]*, or *P.O. Box 187, Canmer KY 42722.*

MAR 2, 3

ANNANDALE, VA Winterfest^{SM}, Metro DC's first and best hamfest, will be held by the Vienna Wireless Society, Sunday, March 3rd, 8 a.m.–2 p.m. at Northern Virginia Community College campus, Annandale VA. VE exams Saturday, March 2nd at 9 a.m. All activities indoors. Directions: In northern Virginia, I-495 (Capital Beltway) to Exit 52A (Rte. 236/Little River Tpk. westbound). NVCC is 1 mile on the left. Admission $6. Vendor tables $20. For vendor info, contact *Terry Hines N4ZH, 703-560-1824.* Additional info can be found online at *[http://winterfest.home.att.net/].* E-mail *[winterfest@att.net].*

MAR 9

SCOTTSDALE, AZ The Scottsdale ARC, Inc., will host a hamfest March 9th, starting at 6 a.m., at Scottsdale Community College, 101 North - Exit Chaparral Rd., in Scottsdale. Parking $2. Tables $10. RV parking, self contained. VE exams. Refreshments. Talk-in on 147.18. Contact *Ed Nickerson WU7S, 902 N. 73rd Place, Scottsdale AZ 85257.* Phone *480-949-5162,* E-mail *[Bnickers@qwest.net].*

MAR 9, 16, 23, 28, & SEP 24

ST. LOUIS COUNTY, MO Three all-day training Severe Weather Observation seminars are planned at various locations around St. Louis County MO. At most locations SKYWARN Level 1 training will be presented in the morning, and classes resume in the afternoon with the SKYWARN Level 2 Program. Training will be held as follows: Saturday All-Day Classes: March 9th, March 16th and March 23rd. Evening classes (Level 1 only): March 28th and September 24th. For locations call the Severe Weather Information Line, *314-615-7857,* for a taped message and additional information. There is no charge for the training.

All are welcome including those from outside the area. Free parking. Certification provided for R.A.C.E.S. and SKYWARN, all at no cost. Attendance by members of the amateur radio community is encouraged, however, one need not be a ham operator to attend and participate in the program. Come and be a part of the largest SKYWARN program in the area, and monitor our SKYWARN nets during severe weather on 146.940 or 147.360 MHz.

MAR 16, 17

MARIETTA, GA The 49th Annual Kennehoochee ARC Hamfest and 1st Emergency Communications Expo will be held at Jim Miller Park (formerly Cobb County Center Park), in Marietta. A map is available on the Club Web site at *[http://qsl.asti.com/hootch/KARC-HamF.html]*. This event is open Saturday 8 a.m.–5 p.m. and Sunday, 8 a.m.–3 p.m. Vendor setup Friday, March 15th, beginning at 1 p.m. Admission (good for both days) $5 at the gate. Children under 12, supervised by an adult at all times, are admitted free. Along with all the usual hamfest trappings, a one-day (Saturday) Technician Class "Boot Camp" will be held on site. The onsite exam for "boot campers" will be held at 5 p.m. Saturday. All other VE Exams will be at 9 a.m. Saturday only. Bring a copy of your license, there is no copier on the premises. The Emergency Communications Expo will feature exhibits and static displays from local and state emergency teams, vendor booths, and informational seminars. Outside (under cover) bone yard and tailgating spaces are available. Talk-in on 146.880(-) PL 100 (KARC reptr.) from Friday, March 15th at 1 p.m., all day Saturday, March 16th; and until 2:30 p.m. on Sunday, March 17th. For more info contact *Mike Fisher KG4DPF, 770-971-3610;* or *Bob Butler W4RBB, 770-579-9420,* before 9 p.m. EST. You can send E-mail to *[w4rbb@arrl.net]*. Send written inquiries to *KARC, P.O. Box 1245, Marietta GA 30060.*

MIDLAND, TX The Midland ARC will hold their annual St. Patrick's Day Hamfest on Saturday, March 16th, from 8 a.m. to 5 p.m., and on Sunday March 17th from 8 a.m. to 2 p.m., at the Midland County Exhibit Building. Huge inside flea market with many dealers, large tailgate area, T-hunts, and a full service concession stand with hot meals, are some of the features. VE exams will be given at 1 p.m. on Saturday. Pre-registration is $8, $9 at the door. Tables for non-dealers are $12 each for the first four, and $20 for each additional table over four. For more info, contact the *Midland ARC, P.O. Box 4401, Midland TX 79704;* or contact *Larry Nix N5TQU* by E-mail at *[oilman29@home.com]*. You can view the hamfest flyer online and download a registration form at *[http://www.w5qgg.org]*.

MAR 17

JEFFERSON, WI The Tri-County ARC will sponsor a Hamfest Sunday, March 17th, 8 a.m.–2 p.m., at the Jefferson County Fairgrounds Activity Center, Highway 18 West, Jefferson WI. Vendors will be admitted at 7 a.m., all others at 8 a.m. only. Vendors only parking will be provided for unloading. Talk-in on the 145.49 rptr. Admission $4. Table space for 8 ft. tables @ $6 each. For further info, contact *TCARC, 213 Frederick St., Fort Atkinson WI 53538.* Evening phone *920-563-6381,* Fax *920-563-9551;* or send E-mail to *[tricountyarc@globaldialog.com]*.

MAUMEE, OH The Toledo Mobile Radio Assn. (TMRA), will hold its 47th Annual Hamfest/Computer Fair, 8 a.m.–2 p.m., at the Lucas County Rec. Center, 2901 Key St., Maumee OH. For details, send an SASE to *TMRA, P.O. Box 273, Toledo OH 43697-0273.* For voice mail call *419-535-6594.* Web *[www.tmrahamradio.org]*.

MAR 23

BRAMPTON, ONTARIO, CANADA The Brampton Fall Fairgrounds will be the location for "HAMEX 2002," co-sponsored by the Peel and Mississauga Amateur Radio Clubs. This event will feature amateur radio equipment manufacturers, major commercial vendors, new and used equipment and parts. VE exams, seminars, exhibits and demonstrations. Vendors are admitted at 7 a.m. The general public can enjoy this event from 9 a.m. to 1 p.m. Admission $6; 6 ft. tables $25; 8 ft. tables $30., includes one free admission per table. Talk-in on VE3PRC at 146.880(-), and VE3MIS at 145.430(-). For more info contact *Jason Staines* at *416-878-0576;* or *Lorne Jackson, 905-858-8594.* E-mail can be sent to *[va3ngv@rac.ca]* or *[ve3cxt@rac.ca]*. For online info, set your browser to *[www.peelarc.org]*.

MAR 24

MADISON, OH The Lake County ARA, of Painesville OH, will hold its 24th annual Hamfest/Computerfest, 8 a.m.–2 p.m., at the Madison High School, 3100 Burns Rd., Madison OH. This event will feature new and used amateur radio, computer, and various other types of electronic equipment. The LCARA Hamfest will also feature craft demonstrations, and VE exams for those interested in earning an amateur radio license. Admission $5, tickets may be purchased at the door. 6 ft. tables are $8 each or $15 for two. 8 ft. tables are $10 each. For table reservations, call *Roxanne* at *440-209-8953.*

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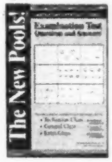

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Ten-Tec's Century 22

Many of us got our first taste of QRP operation using the Ten-Tec Argonaut 505 or Argonaut 509. However, there's another rig made by Ten-Tec that feels very much at home in the QRP operator's shack. It's the Century 22.

Ten-Tec told the world that they started with a clean sheet of paper when they set out to design the new rig as a follow-up to the Century 21. What they ended up with was a radical departure from the Century 21, while still holding onto most of its circuits from the Century 21.

The Century 22

The Century 22 covers the lower CW segments of the 80-, 40-, 30-, 20- and 10-meter bands. It's a CW-only rig, but you can listen in on SSB. The Century 22 operates from an external 12-volt power source and requires about five amps from the supply. You can operate the Century 22 from a 12-volt battery, making the radio ideal for use in the field. (Remember that the Century 21 also operated 12 volts, but the supply was built-in. It was possible to operate the Century 21 from an external power source by back-feeding the power into the AUX jack.)

The Century 22 uses an analog dial with a band segment indicator. The radio also features a built in SWR/power meter. The meter doubles as an "S"-meter on receive. Of course, the Century 22 sports the famous Ten-Tec QSK keying. All of this is wrapped around a solid aluminum chassis with a plastic bezel for the front panel. The Century 22 weighs in at six pounds.

While Ten-Tec did not set out to build another QRP transceiver, the Century 22 can easily operate at the QRP power level. The Century 22 has an input power of about 50 watts. So, figure on about 20 plus watts of RF into a 50-ohm load. For QRP operation, the ALC is simply adjusted to what ever value you want, down to about three watts.

The receiver in the Century 22 is a double direct conversion type. Now, you may be rolling your eyes around, but the receiver in this radio is truly a work of engineering. It does not suffer from microphonics, drift, or even the howls and whistles one would normally associate with a direct conversion receiver. Instead, you get a radio with plenty of audio, a stable PTO, and an adjustable audio bandpass.

Inside the Century 22

The top half of the Century 22 case is just about empty. The only "stock" PC board is the final amplifier. There are two spaces reserved for the only two options, the 679 keyer and the 226 calibrator. Either of these options is easy to install. Just screw the board down and plug it in.

The bottom half of the radio holds the majority of PC boards. All the band switching is done with a multiposition wafer switch that passes though the various PC boards. The transmitter output filter board is also located on the bottom half of the radio.

Operating the Century 22

Unlike a superhet receiver in which you have single signal reception, in a direct conversion receiver, you have a tone on either side of zero beat. To ensure you have the proper sideband, tuning the Century 22 is a bit, well, different.

The best way is to center the RIT control and then tune in a station with the main tuning knob until the station is zero beat. Then move the RIT control until you hear a beat tone. Now you can transmit and the other station will hear you.

One of the nice things about a direct conversion receiver is the ability to tune to the other side of zero beat. If QRM is really heavy on one side, simply move the RIT control to the other side of zero beat.

Once a station is tuned in, you can adjust the audio filter to help reduce QRM. The four-pole audio filter is adjustable down to 200 Hz wide. This audio filter is centered at 750 Hz and provides up to 24 dB per octave. If you like to listen in on your favorite SSB net, opening the audio filter control full clockwise effectively removes the filter from the audio chain.

Adding some features

Out of the box, the Century 22 has ample space on the inside top half to house the 679 keyer module and the 226 calibrator. Unfortunately, for us, both of these options are no longer being made by Ten-Tec. However there is a work-around available. The guts from the 679 keyer itself will work. So all you need to do is locate a broken K5 keyer from Ten-Tec and strip out the module. It will bolt directly inside the Century 22.

The calibrator is a much harder item to find. If you're lucky, the same calibrator is used in the Ten-Tec Argosy. You might be able to find one inside an Argosy if you find a parts-out Argosy.

There is another option, and that's to build one yourself. I have built two prototypes of the calibrator using surface mount parts. Not an easy project if you have never worked with surface mount IC and transistors. Right now, the stumbling block has been locating a 7490 IC in an SMT package. When I can get all the loose ends together, I'll present the project here.

Some odd and ends

The other day I was trying to work some DX on ten meters when the radio just up and died. The receiver went dead and the transmit SWR was out of sight. After checking the antennas, I found the problem to be a bad coax jumper cable. The center conductor had broken off inside the connector.

Continued on page 58

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Helping Your Community With RDF

Some years ago, English writer Shirley Conran rewrote Parkinson's Law into her own Law of Housework: "It expands to fill the time available, plus a half hour." Her law could just as easily describe the feelings of most hams, especially those who enjoy radio direction finding (RDF).

Time really does fly when you're busily finding transmitters. Many a time I have glanced at the clock on a Saturday night hunt for multiple transmitters and have been amazed to see that it had become well past midnight! RDF fun has made the years fly by, too. "Homing In" is now in its 14th year in *73 Amateur Radio Today* magazine.

I'm sure there are still some regular readers who haven't tried RDF contesting yet. Why not? If you're athletic, you could become a champion at on-foot foxhunting, also called radio-orienteering and ARDF. If you prefer to sit while you enjoy ham radio, try a mobile T-hunt for a new adventure. Who knows where you'll end up and what you'll find!

Beating the Buzz

As I have pointed out many times over the years, ham radio hidden transmitter hunts, both mobile and on foot, are excellent practice for real-life RDF situations such as tracking aircraft Emergency Locator Transmitters and sources of unintentional interference to both ham and nonham frequencies. If your work involves communications, this knowledge can even help when you're "on the clock."

Paul Shinn KG6AOH of Stockton CA practices his RDF skills on ham transmitter hunts in the San Francisco Bay area, then uses these skills in his work as a broadcast engineer. Besides ham and broadcast radio, Paul is active on the UHF GMRS band. He E-mailed to tell of some of his RDF efforts on those frequencies.

Working with Doug Smith WA6GON, Paul located a data transmitter on 462.7 MHz at a mining company in Lone CA **(Photo A)**. A former owner of the facility had a license for voice operation on that frequency, but digital data on GMRS channels is not allowed. Later, the two tracked an inventory control system transmitter at a store in nearby Jackson (**Photo B**). It put out spurious emissions covering almost 300 kHz in the GMRS repeater input band.

Paul prefers doppler RDF methods for this type of hunting because such sets work over wide frequency ranges. His receiver of choice is a Model 1200 Communications Service Monitor by IFR, Incorporated, of Wichita KS [http://www.ifrsys.com]. Covering 100 kHz to 1000 MHz, it has a much "tighter" receiver than a typical hand-held or mobile scanner. It also includes a spectrum analyzer, deviation meter, and a host of other RF servicing and troubleshooting instruments that he can use to convince owners of interfering equipment that they need to make repairs or adjustments (**Photo C**).

"I use the IFR 1200 all the time on my bench," Paul wrote. "The receiver is exceptionally selective and also quite sensitive. I can perform RDF in FM narrow, medium, or wide modes, even in really strong signal conditions such as those at high level radio sites. Also, I can demodulate in AM, AM wide, and SSB modes. Of course, while DFing an AM signal, I

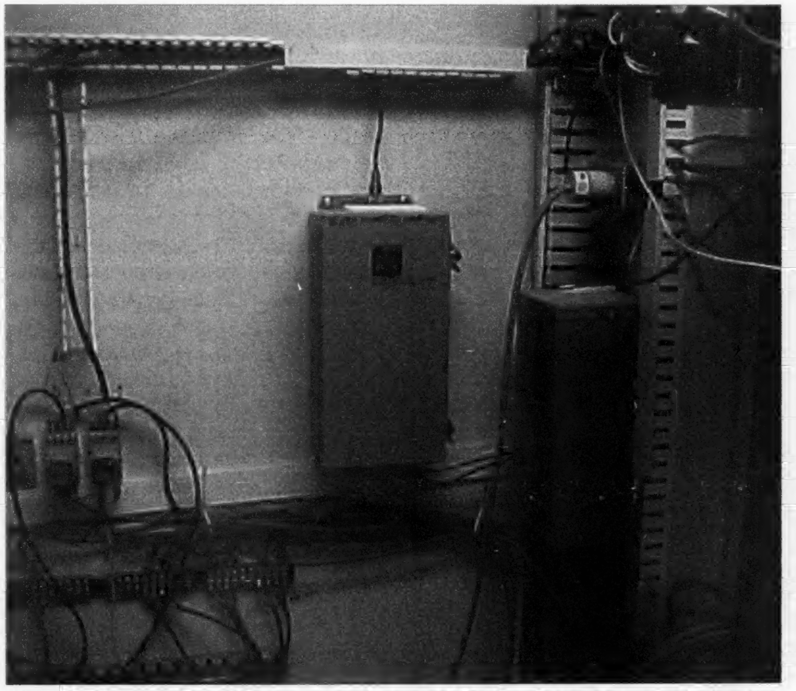

Photo A. *Owners of a mining company in central California were surprised when two hams tracked down this illegal data transmitter in their facility. (Photo by Paul Shinn)*

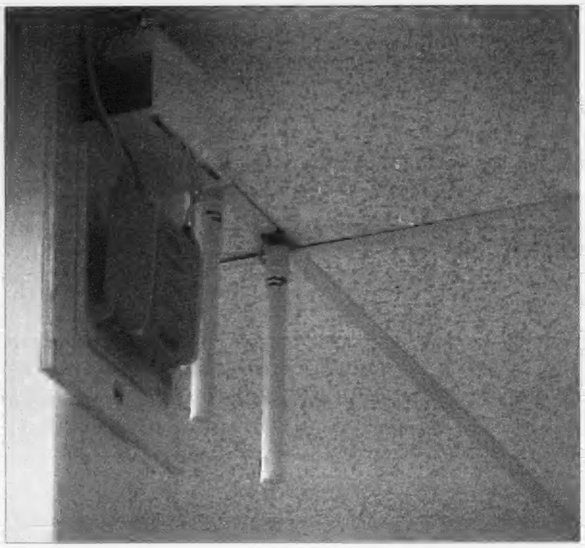

Photo B. *This inventory control system in the ceiling of a store in central California caused QRM to GMRS operators. Two volunteer RDF-equipped hams found it. (Photo by Paul Shinn)*

Photo C. *KG6AOH usually does his transmitter hunting alone. His IFR-1200 Service Monitor sits where the passenger's legs would normally be. (Photo by Paul Shinn)*

have to use one of the FM modes to get the doppler tone effect."

Delinquents Discovered and Deterred

Whenever a radio is stolen or lost, there's a good chance that it will show up on the air in the hands of someone using it to cause interference. Hams with RDF equipment and skills can perform a valuable public service by helping to recover the radio and stop the QRM. Such a story came in recently from John Munsey KB3GK of Ormond Beach FL.

"On June 21, I was in Jacksonville when a cell phone call alerted me that there was interference on our school board repeater," John wrote. "Upon returning home, I learned that someone had broken into a Volusia County School Board warehouse and taken at least two hand-held radios, complete with chargers. Now there were voices on the school's communication system, interrupting transportation communications and reporting false emergencies involving school buses. The stolen radios had little value and were headed for recycling, so the major concern was the interference they were causing.

KB3GK continues, "My hunt partner, Bill Thomas KE4HIX, and I went on alert, waiting for the transmissions to resume. I installed my doppler set, packed hunt gear in the trunk of the car, and we were ready. The frequency was 453.425, not in a band normally used for hunting in this area, so new antennas and antenna spacing were required.

"All was quiet for several days, with only an occasional key-up or short comment. The perpetrators appeared smart enough to limit their conversations to quick transmissions so as to not be found. This continued until July 19, when we were alerted that two boys were talking on the frequency. I was about 30 miles away, so I quickly returned and picked Bill up. The hunt was on.

"We decided to hunt only one of the two signals, because that operator was doing 80% of the talking. He also had the strongest signal. Following the doppler headings, we drove almost directly to a location where the signal peaked and the display pointed clearly at one particular house. We circled the block, noting that the doppler heading continued to cross over the same location. To confirm, we drove behind a local business where we were directly in back of the suspect location. Again, the doppler pointed directly at it.

"We drove the street in front of the suspect's house several times in both directions. Each time, the doppler gave a strong lock on the same house. Noting that all windows were covered, we pulled into the driveway to the right of the house. The reading shifted to a solid 270 degrees, pointing solidly at the side of the house. Signal strength peaked and we were satisfied that the target had been found.

"Arrangements had already been made with the Daytona Beach Police for support, so a call was made to Steve Szabo WB4OMM, a supervisor in the Detective Department. In a few minutes, we were joined by three marked police cars. This area was not in the best part of town, so residents likely suspected a drug bust or other such activities. Several of them were looking out of windows or standing in doorways. A few were brave enough to venture out on their front steps.

"Without a search warrant, the police could not legally enter the suspect house. It was decided that officers would surround the house and then knock on the door to question the occupants. After several minutes, an older lady came to the door and, upon questioning, insisted that there were no children in the house. After some discussion, everyone left. Of course, we suspect that the delay in answering the door was time used to hide the boy and his radio.

"The police officer in charge had little confidence in RDF technology. He described himself as a 'techno-phobic' and was proud that he didn't own a computer. He suggested that we had been misled by an 18-inch satellite TV dish on top of the house and perhaps we had been tracking that. With that attitude, it was not surprising that questioning of the resident was not pressed harder.

"In the boys' conversations, they had made plans to talk again at 2 p.m. the following day, after one got out of school. When that time rolled around, we were in position about two miles away, where we suspected that the other boy lived. Nothing was heard, and at 3:30 we called it a day. We guessed that the previous day's activity had given the boys the scare of their lives and that they would either be off the air for a long time or get rid of the equipment. Sure enough, no additional transmissions have been heard.

"We did not recover the radios, but it was a fun hunt and demonstrated to the school board that volunteers doing RDF can be effective in such a situation. If the problem recurs, we will have the cooperation of the board and administration. We will remain on alert."

Nice work, John and Bill! It was wise to make contact with the police ahead of time. When you go after jammers and stolen radios, you're probably not going to be meeting candidates for Citizen of the Year awards. A recent E-mail from Tom Lewis AB5CK of North Richland Hills provided a vivid reminder of that. Tom told of an individual that was tracked down by T-hunters in Lewisville TX after two weeks of malicious interference on a local repeater.

"It was later discovered that this person had 51 legal offenses and 7 convictions against him," AB5CK wrote. Then he went on to point out that this case reinforces the need to use extreme caution on this type of hunt. "Never approach anyone who willingly breaks the law," he concluded. "This guy is bad news! Fortunately, I was not the one who discovered him."

How to RDF on FRS?

Several "Homing In" readers have E-mailed about the problems of getting RDF bearings on the new Family Radio Service (FRS) frequencies. There are 14 FRS channels, half near 462.6 MHz and the remainder near 467.6 MHz. The letter from Ralph Milnes KC2RLM of Chatham NJ was typical:

"Recently, our RACES group tried to track a signal in the FRS band. Our premise was that we might be asked to find a lost hiker with an FRS radio. We tested in a two-mile square park with lots of trees that hadn't leafed out yet, and surrounding low hills. We weren't very successful using time-difference-of-arrival sets, yagis cut for 462 MHz, and body-shielding techniques. We had trouble attenuating to the right amount and may have been experiencing multipath. I wonder if there are special tips or tricks for RDFing in the UHF range."

Ralph, first it's important to realize that multipath will always be a greater problem on 462 MHz at a given site, compared to 146 MHz. That's because more objects will reflect UHF signals than VHF. If you own a scanner or wide-range handie-talkie that covers the FRS frequencies, you can use it with a built-to-frequency yagi or quad antenna for a very effective on-foot RDF setup (**Photo D**). A lightweight 440 MHz yagi such as the Model 440-3 by Arrow Antenna [http://members.aol.com/arrow146/] is a good candidate, if you trim about a quarter inch from each end of each element.

Active attenuators such as the one at my Web site should work just fine with these receivers. For mobile RDF, doppler sets such as the Roanoke Doppler are well suited for use with a scanner or other wide-range receiver on FRS frequencies.

On the other hand, attempting to use those inexpensive "drugstore" FRS radios for RDF in place of a scanner presents two problems. First, FRS radios don't have S-meters. Second, they have permanently mounted antennas with no provisions for attachment of coax.

The waveguide-below-cutoff attenuation technique is a possibility. Using the strap to lower the FRS set into a foil-covered cardboard tube will gradually attenuate the RF going into the case and whip antenna, allowing you to use the classic "body shield" maneuver to get the incoming signal direction. Try it with a tube of about 3-inch diameter and 2-foot length.

Now, here's your homework assignment: Come up with more original, simple, and effective ways of using those "bubble-pack" FRS hand-helds for portable RDF on that band. The best response, if published here, will earn an autographed copy of my co-authored book *Transmitter Hunting — Radio Direction Finding Simplified* (published by TAB McGraw-Hill, ISBN 0-8306-2701-

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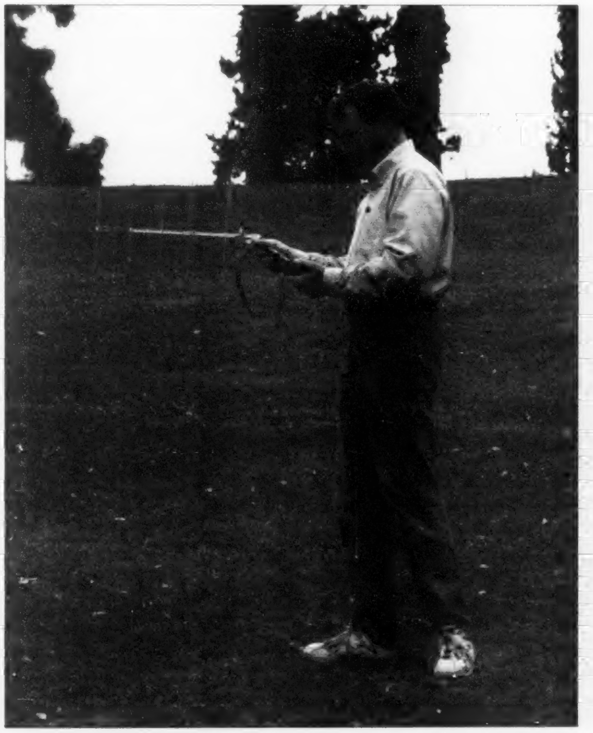

Photo D. *Dave Reeves AC6PP uses a small yagi and his scanner on the SuperSystem 440 MHz transmitter hunts in Orange County CA. Such a setup is easily adapted to foxhunting on the FRS band.*

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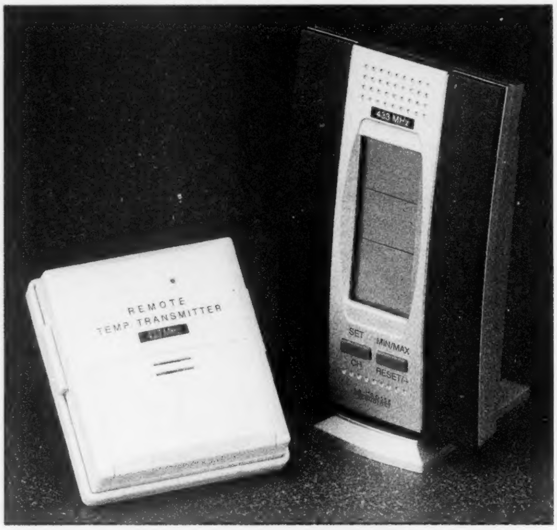

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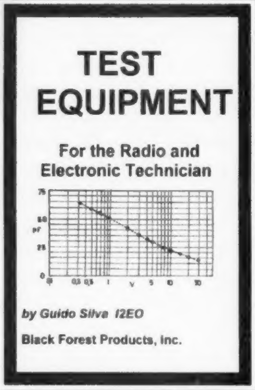

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To Change and To Serve

There is no doubt that our perception of the world underwent a significant change on September 11, 2001. Before the terrorist attacks, who would ever have expected that the National Guard would patrol our airports? The concept of Air Force fighters patrolling the skies over New York City and Washington DC was formerly reserved for science fiction.

Our views as individuals, as citizens, and as a nation have been altered. But as amateur radio operators, how must we change to continue to serve our nation, our communities, and our neighbors?

You can't help but have noticed that amateur radio was there in support of rescue and recovery operations. You may have monitored some of the support efforts or read about it in one of the ham radio publications. In any case, it was obvious that we were represented by hams from all over the country who served as communicators or wherever else they could be useful. But in the same way that after that September morning the words "business as usual" changed their meaning, so we as hams must expect that our role and duties will also change.

I was struck with several things as I read the reports of hams in action and compared them with other news sources. I have long espoused the need to be involved with a public service agency long before the requirement for support exists. This may be the Red Cross or Salvation Army or the county or parish disaster services department. I believe that this is even more critical after 9-11. Showing up with a radio and good intentions will not necessarily get you invited to help out.

Police, fire, and the National Guard must be far more cautious in terms of who is given access to the scene of a disaster. We had the luxury in the past of being able to assume that the damage was due to an accident or a freak of nature. A storm came, caused damage and moved on. The threat was pretty much over. Now we must assume that if the disaster was due to someone's efforts, they may intend to continue to cause harm. The threat may be ongoing during the rescue and recovery phases. As such, we as hams must expect to be scrutinized with a skeptical eye rather than welcomed with open arms. It needs to be clear why they should allow us access to an area while refusing it to others.

The lesson to be learned here is that it is critical that ham operators and ham radio clubs get to know and to be known by the agencies they expect to serve. They must also be able to be clearly identified by others. If you support a local hospital, you should not expect to be permitted to enter it without having adequate identification. In the past, it was common to report to a central location and then be escorted to one's duty location. This is time-consuming and inefficient, to say the least.

If you are assigned to a particular agency, they may be able to provide the appropriate credentials. This may involve undergoing a background check and then receiving an identification card or badge from the agency you will support. This won't necessarily replace the Amateur Radio Emergency Service (ARES) or Radio Amateur Civil Emergency Service (RACES) card you may carry now, but will be in addition to it. I recommend having your agency identification, ham license, driver's license, and hospitalization card on your person when responding.

Of course, there are also other benefits to being involved in advance with the agency with which you expect to work. It can mean that you will be better prepared to provide assistance because you will have an understanding of what is to be expected. You may even have the opportunity to practice your duties a bit and develop some of the skills before they are actually needed.

September 11th also can be expected to require changes from the way we have traditionally provided support. APRS, for example, may no longer be the mode of choice for many types of disaster service communications. Although it was beneficial in the past to be able to identify a station's location, in the event of any kind of attack, that information is best kept available only to those who need to know. It may be most unwise to identify where the incident commander is located, much less any key government officials who might be visiting the area. With the advent of so many soundcard-based systems for receiving digital modes, packet, APRS, etc., can be monitored with a scanner, a patch cable, and a computer running shareware. Oddly enough, with the rest of the world abandoning CW as a mode of communication, it may provide one of the most secure methods for handling sensitive traffic. Computer decoding of Morse code is not very effective, so individual skill is needed to provide solid copy.

Another big change appears to be the types of equipment we'll be expected to bring with us. From what I've heard, handheld radios with rubber ducky antennas proved to be virtually worthless. Although they are often of limited utility, this was especially true since several key repeaters were apparently located on or near the World Trade Center. In this type of situation, expect to take along a 25 watt (or higher) dual-band mobile rig with an appropriate antenna and power source. Not only are the additional frequencies useful, but cross-band operation may thwart at least some monitoring.

Finally, don't be surprised if some of the traditional amateur support is moved away from the ham bands. I fully expect to see more emphasis on Military Affiliate Radio

Continued on page 59

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More Fun

The activity in your ham digital modes is increasing exponentially, or at least, that is the way I view it. Just a few years ago, you might find a handful of signals on the waterfall at what could then be considered "prime time." Now, when there is any propagation and there are a few hams awake and at the keyboard, there is worldwide activity. Amazes me — it is the way it should be — just hard to believe we are witnessing such growth in numbers.

What this means to you is a great opportunity to find enjoyment as never before in ham radio. The playing field is leveling as we find very few hams running any kind of spectrum annihilating power. As a matter of fact, most "big guns" are running less than 50 well adjusted (clean signal) watts to a good antenna. The average successful station is running the same power with a trap vertical or equivalent. And they are not just working stations around the block. Many are working serious DX.

What I am saying is, you can join in the fun with relatively no investment if you already have an HF station on the air.

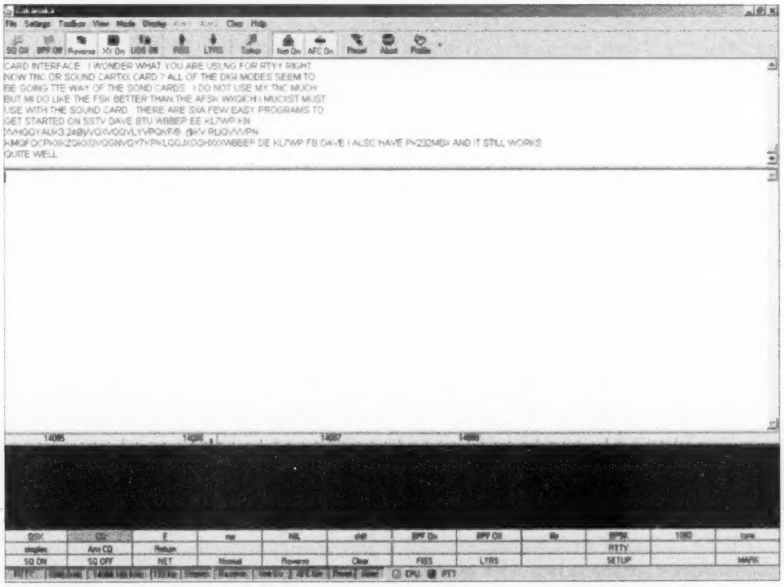
The reason I started with these thoughts is that I recently received a request from a ham asking for specific items to get started in digital communications. Judging by his message, I decided he was as well experienced as I am with CW and SSB and probably well versed in the vacuum tube era recently gone by. (Recent is a relative statement I will not get into just now <grin>.)

So my answer in a few hundred words explained how he could find directions to make a simple interface such as what I use at a cost of $20, plus or minus, and just about everything else was free. A new digital ham can bypass the roll-your-own cabling by purchasing one of the several ready-to-plug-in interfaces on the market which range in price from $40 to $140.

Further, I gave him the URL to find the DigiPan software, which is free, and explained there were links there to find these little black plug-in boxes, all of which seem to work for the hams I run across using them. And, the real biggie is the Help file in the DigiPan software that is so well written that I direct everyone with a need for plain language explanations accompanied by diagrams to download DigiPan and drink in the information. It has solved more problems remotely for me than any other available method. Quick, but not dirty.

And yes, once we have become hooked on this digital stuff, it becomes ever more easy to justify purchasing all the finery from our favorite ham equipment manufacturers. But it is definitely not an expensive portion of the hobby. You can get your feet wet without drowning your bank account.

As you look at all the software with instructions, everything you need is immediately available to get you into this most fascinating aspect of ham radio. There are numerous new modes to choose from, plus a huge



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CARD INTERFACE  I WONDER WHAT YOU ARE USING FOR RTTY RIGHT
NOW TNC OR SOUND CARTXX CARD ? ALL OF THE DIGI MODES SEEM TO
BE GOING TTE WAY OF THE SOND CARDS  I DO NOT USE MY TNC MUCH
BUT MI DO LIKE THE FSK BETTER THAN THE AFSK WXQICH I MUCXST MUST
USE WITH THE SOUND CARD  THERE ARE SXA FEW EASY PROGRAMS TO
GET STARTED ON SSTV DAVE BTU WBBEP EE KL7WP KN
XVHQQYAUK3.24@)VQXVQGVLYVPQKF/8 (I)KV RUQVVVPN
KMQFQCPKXKZQKXXVQGNVQY7KPKLQQJXQQHXXWBBEP DE KL7WP FB DAVE I ALSO HAVE PK232MBX AND IT STILL WORKS
QUITE WELL
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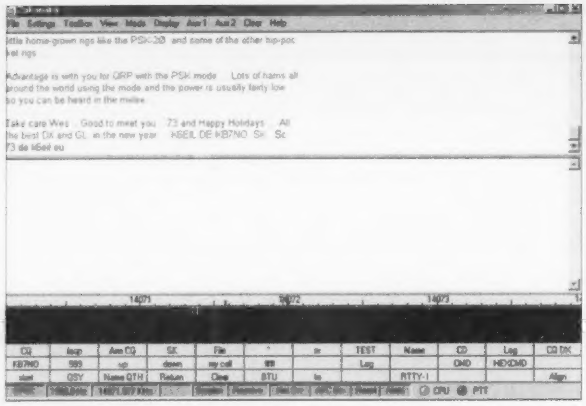
Fig. 1. *This is a screenshot of Zakanaka in the RTTY mode using the MMTTY engine. I was simply "reading the mail" during this exercise. Note the frequency readout above the spectral display. Logger reads the frequency of the rig and Zakanaka displays it. I have the spectral display on. The contrast in the shot may not make this very plain. The software is set for reverse mode which can be controlled from several menus, the easiest is to click the button at the top of the screen. The 36 macros at the bottom are easily programmed according to the needs of the user (see text). In the middle of the top row of icons is a button for "setup." Click that and the regular MMTTY setup screen appears. Also, the Logger entry screen responds for RTTY logging automatically.*

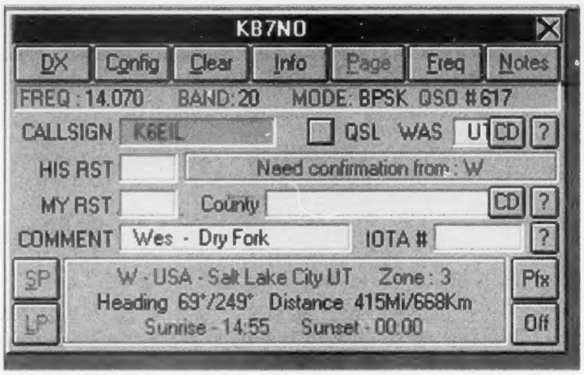


ittle home-grown rigs like the PSK-20 and some of the other hip-poc
ket rigs

Advantage is with you for QRP with the PSK mode   Lots of hams all
around the world using the mode and the power is usually fairly low
so you can be heard in the melee

Take care Wes   Good to meet you   73 and Happy Holidays   All
the best DX and GL in the new year   K6EIL DE KB7NO SK   Sc
73 de k6eil eu

Fig. 2. ***This is Zakanaka in PSK31 mode. This was at the tail end of a real QSO with a QRP PSK station running 750 milliwatts. At first glance this looks about the same as the RTTY mode in*** **Fig. 1**. *However, you will notice a whole different set of captions on the macro buttons and the toolbar at the top has nothing to do with RTTY. It is like a totally separate program for each mode. In both modes, there are 36 macro buttons which you can control with function keys from the keyboard (see text). I have the waterfall display turned on in this mode. You can use either spectral or waterfall display in either mode. Many other programs have a call box where the other station's callsign is displayed when you double click the call in the receive screen. Here, in either mode, that call box is in the Logger entry screen (see* **Fig. 3**). *When you invoke a macro that needs the callsign Zakanaka retrieves it from Logger. The logging system is quite simple to use. If your rig will communicate with Logger, much of the entry is automated.*



FREQ : 14.070 BAND: 20 MODE: BPSK QSO # 617

CALLSIGN K6EIL ☐ QSL WAS U

Need confirmation from : W

COMMENT Wes - Dry Fork

W - USA - Salt Lake City UT Zone : 3
Heading 69°/249° Distance 415Mi/668Km
Sunrise - 14:55 Sunset - 00:00

Fig. 3. *This is the Entry panel for Logger. Logger has many panels to suit its various functions, including a full display of logged contacts you may scroll through or search, as well as a previously worked screen where a familiar callsign pops up on entry. This is the one you deal with the most. After I was finished with the QSO mentioned in* **Fig. 2** *and had logged the contact, I double clicked the callsign again on the receive pane and the above information displayed. By the way, this "6" station was in Utah. You will note the QSO is numbered 617 in the upper corner. I had used the import feature to bring into Logger previous contacts from another file. The 600 contacts took perhaps 2, no more than 3, minutes to import and sort their way into organization. Excellent import feature. If you are searching for nothing more than a full featured logging system and do not wish to pay bucks for it, this is a very useful FREE tool for your hamshack. It will print a hard copy of your log files and also has a label print feature.*

selection of freeware, so you may get started on this new feast of technology for the low cost of a few hors d'oeuvres. The most expensive piece of equipment you need is your rig, and most rigs manufactured in the last 15 to 20 years can be outfitted for digital performance.

What price, fun?

Do you need an expensive computer? Simply answered — no. The other day I was working a ham on PSK who had suffered a serious malfunction in his main computer and was operating with a $10 computer he had rescued from a thrift store. I don't know all the story behind it, but this is a lesson in simplicity. The big-buck machine must not have proved indispensable, especially if it could be replaced with something that sounded pretty obsolete.

As for rigs, in addition to Icom, Kenwood, Yaesu, and Ten-Tec, I work many hams with QRP rigs they have assembled from kits such as Elecraft, and many of the little "pocket-sized" rigs running 1 or 2 watts and powered by dry cells or wall-warts if they are still at home. As an example, today's PSK screenshot (**Fig. 2**) is the trailing end of a QSO where the other station was running 750 milliwatts. And he was truly S-9 ! A little less than 500 miles away, but still excellent print on the monitor.

So what am I really leading up to this month? I know — you were likely attracted by the pictures. No wonder SSTV is so fascinating. Okay, no airborne pictures, but what we have are best explained by pictures about freeware.

You are going to see some pretty great things you can do with software you can download absolutely free from the Internet. I have done a few articles on the Zakanaka/Logger combo in the past, but the development just keeps on enhancing the product.

You will find the files are relatively large, something around a 45-minute download if you get a good connection. But you probably already know that drill and the consequences when the download slows to a crawl. These particular downloads went like clockwork. No, if you are asking, I do not have cable. Don't see the necessity for a home computer setup.

Several things attracted me to the Zakanaka software this month. This is one of several programs having RTTY capability facilitated by the use of the MMTTY engine from Mako JE3HHT. The full-blown MMTTY program works like a dream as a standalone for RTTY only. Seldom is heard a discouraging word about this soundcard program, even from dyed-in-the-wool green-key aficionados.

At this time, I count three PSK31 programs that are using the MMTTY engine and they all perform well. The others are HamScope and WinWarbler. I have used all three and they are good. I am not going to pass judgment to say which is best, but Zakanaka holds an edge in this computer due to the operating system (ME).

Why am I down on ME?

I have this new whiz-bang computer that I have mentioned in previous columns and it has this not so whiz-bang operating system referred to familiarly as ME [Millennium Edition (Windows)]. I think I should compile a list of the ham software that will and will not run correctly on the ME system.

And I should do that before I take the next step and install the new XP Windows system which I am led to believe fixes most of these problems. The drawback I see with the XP, though it is another uncharted territory to enter, is that it is reported that if you purchase an over-the-counter piece of new software you can install that package in exactly one computer equipped with XP.

That doesn't bother me too much, but the principle rubs me the wrong way. I really don't have need to install a single purchase program in bunches of computers but do like to outfit the laptop with the same software as the desktop to facilitate data file transfer.

Anyway, all that aside, I found the software I wanted to experiment with this month does not work just quite right under ME. It works, but certain necessary aspects cannot be controlled.

By contrast, I am finding that MixW2 runs quite well under ME. And, as I was explaining to the aforementioned ham about DigiPan, it seemed wise to download that program and refresh my memory to be able to answer questions. DigiPan works like gangbusters, just as if it was running under a "real" operating system like Win95 or 98. Thus far, Windows 98 is the all-time champ in my books for running ham software. Everything works on 98.

So this month I was planning to give a go at the DXLab suite of programs because there has been a lot of progress with these

Source for:	Web address (URL):
Mix W Soundcard program for PSK31, RTTY, new modes, MTTY, FSK31, more	http://tav.kiev.ua/~nick/mixw2/ www.nvbb.net/~jaffejim/mixwpage.htm
FREE MMHam site — MMTTY — MMSSTV	www.geocities.com/mmhamsoft/
FREE VK7AAB — SSTV-PAL — PSK-PAL	http://users.origin.net.au/~crac/
Much ham info w/SSTV downloads	www.conknet.com/~kb1hj/index.htm
TrueTTY — Sound card RTTY w/ PSK31	www.dxsoft.com/mitrtty.htm
Pasokon SSTV programs & hardware	www.ultranet.com/~sstv/lite.html
PSK31 — Free — and much PSK info	http://aintel.bi.ehu.es/psk31.html
Interface for digital - rigs to computers	www.westmountainradio.com/RIGblaster.htm
Soundcard interface info — includes Alinco	www.packetradio.com/psk31.htm
Interface info for DIY digital hams	www.qsl.net/wm2u/interface.html
WinWarbler info and DXLab Suite	www.qsl.net/winwarbler/
MFSK-related tech info — how it works	www.qsl.net/zl1bpu/
Throb — New — lots of info	www.lsear.freeserve.co.uk/ www.btinternet.com/~g3vfp/
Download Logger, also Zakanaka	http://www.qsl.net/kc4elo/
PSKGNR — Front end for PSK31	www.al-williams.com/wd5gnr/pskgnr.htm
DigiPan — PSK31 — easy to use	http://members.home.com/hteller/digipan/
TAPR — Lots of info	www.tapr.org
TNC to radio wiring help	http://freeweb.pdq.net/medcalf/ztx/
ChromaPIX and ChromaSound DSP software	www.siliconpixels.com
Creative Services S/W Multimode w/PSK	http://www.cssincorp.com/products.htm
Timewave DSP & AEA (prev.) products	www.timewave.com
Auto tuner and other kits	www.ldgelectronics.com
XPWare — TNC software with sample DL	www.goodnet.com/~gjohnson/
RCKRtty Windows program with free DL	http://www.rckrtty.de/
HF serial modem plans & RTTY & Pactor	http://home.att.net/~k7szl/
SV2AGW free Win95 programs	www.raag.org/index1.htm
Source for BayPac BP-2M & APRS	www.tigertronics.com/
Int'l Visual Communications Assn. — nonprofit org. dedicated to SSTV	www.mindspring.com/~sstv/
Hellschreiber & MT63 & MFSK16 (Stream)	http://iz8bly.sysonline.it
HamScope — multimode w/ MFSK16	http://users.mesatop.com/~ghansen/
YPLog shareware log — rig control — free demo	www.nucleus.com/~field/
WinLink 2000 System info	www.winlink.org/k4cjx/
Airmail — free program to use WinLink 2000	www.arimail2000.com/
The Chart NOW ON THE WEB	www.geocities.com/normandy214/ham_radio.htm

Table 1. The infamous chart.

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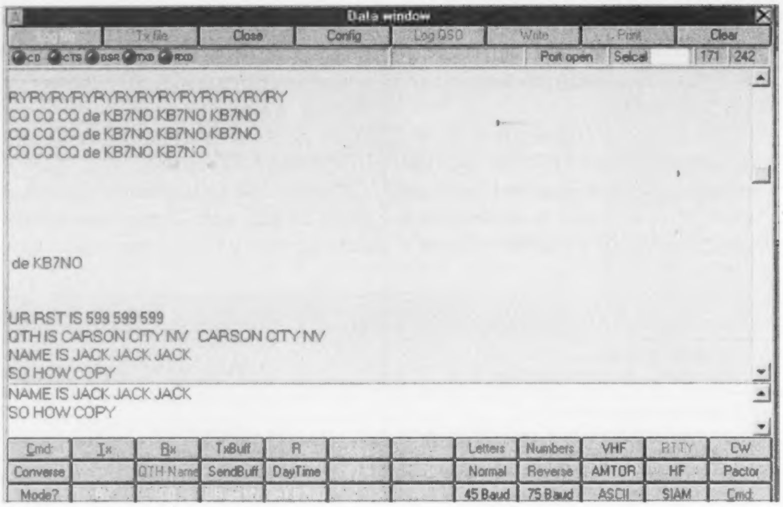

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Fig. 4. *This is the window to communicate with your TNC. There is a file to download from the same site where you find Logger. It has PK232 in the filename. Open this file and it has a set of instructions along with two files, one of which converts the resident Kantronics controls to PK232 format. Of course, if you want to use your KAM, you won't need this. All is in place for you. Here again is a set of macro buttons to configure and edit (see text). I followed the instructions in the file and it took off and worked just great. Very friendly with the PK232 at this shack. A real winner, and no cost. It also transfers log information to the Logger entry screen. However, in this case, no frequency information to share due to only one serial port available for the exercise. Have to type in the frequency by hand. But the macros will search the Logger information when necessary and pick up the info you have already recorded.*

integrated pieces of freeware. A while back I had loaded earlier versions into the Win98 machine and they worked just great. This month I tried the WinWarbler, which now utilizes the MMTTY engine for RTTY and the Commander rig control which has been upgraded to control not only Icom rigs but also Kenwood and Yaesu, and, I think, Ten-Tec.

Well, wouldn't you know?, Murphy struck me down. They run sort of all right but have too many bugs when running in the ME environment. I just couldn't give you an honest evaluation. The MMTTY engine seemed to work just fine and I did have a QSO in PSK and it looked as though the logging program was going to perform well — at least at first. Then the situation started downhill. I know for a fact that these programs are running for others, but the requirements say that they can be used on just about every other operating system Microsoft produces except ME.

After puzzling at the dilemma for a bit, I decided that what I was really after was a combination that would do PSK as well as RTTY, using the MMTTY engine and some snazzy logging all intermingled, and possibly a few other goodies. Zakanaka/Logger is the choice of the day.

Program du jour

You will find a lot of hams using the Zakanaka software combined with Logger, and they are perfectly happy with the setup. Truthfully, I had attempted to install these programs on this computer when I first got it, and the ME system rebelled there as well. But I had mentioned this to a ham on the air not long ago and he was pretty sure these two programs had been modified recently to work with ME.

So, I downloaded fresh copies of the freeware from their Web site as listed in The Chart and they installed perfectly this time. I could not find reference on the Web site concerning ME compatibility, but the rumor was true as best I could tell.

Logger has been a favorite logging program for many hams for a long time. It has easy import and export of files and the program gained a lot of attention a couple of years ago when Bob K4CY added a PSK module to it. This was at a time when most of us were struggling (albeit happily, because PSK31 was new and a resounding success) with the G4PLX original software that had to be tuned oh-so-carefully with the little round tuning indicator. Logger had come on the scene with a spectral display such that you could simply click on the signal and you were immediately in receive decode mode.

That is an idea of just how innovative some of the K4CY software has been along the way. Then came the development of Zakanaka as a dedicated Windows-based, easy-to-use, PSK31 communications program that works hand-in-hand with Logger to make the beginnings of a total package. Logger will communicate with the popular transceivers of today to monitor frequency and contains band plans you can modify to suit your needs. Makes logging as simple as hitting the Enter key.

Now Zakanaka also supports the MMTTY engine for superb RTTY performance at no additional cost (still freeware). Plus, if your transceiver is conversant with Logger, the recorded frequency readouts are displayed in Zakanaka. This means you can use Zakanaka with Logger running in the background, search for previous contacts and display them, do your automatic logging, and switch back and forth between PSK and RTTY with the click of your mouse.

The downloads and installation were simple enough. I had to do a little thinking and research to get the correct parameters into Logger so it would converse with the Icom rig. Once I got past that hurdle, operation was a breeze. I spent a little time listening to RTTY and found the print was exceptional on some of the weakest signals. When I say weak, I mean the S-meter does not even flicker and the spectral display is just barely alive. MMTTY is a great program, whether you use it as standalone or in one of the shells such as Zakanaka.

After you do digital modes for a while you develop some habits with your macros. I have several absolute must macros I write into every piece of software I use. Both Logger (when you are using the Logger PSK module) and Zakanaka provide simple, straightforward macro "language" that allowed me to get my "crutch" macros organized in just a few minutes.

I needed to make a change in the setup for RTTY and found the button for the MMTTY engine setup (the Setup button) brought up the regular MMTTY setup panel and I was on my way in moments.

Also, while getting into the RTTY mindset, I realized Zakanaka macros that you use for PSK are not carried over when you change to RTTY. There is a whole set of macro buttons at the bottom of each of the screen layouts, 36 for PSK and 36 more for RTTY. You will need to look at each individually and be certain whether you can use them as they "come out of the box."

Editing the macros is a cinch. Place your mouse cursor over the macro button and right-click. In Zakanaka, for either mode, you will get a screen to allow editing to suit your style. In Logger the only difference is a screen pops up asking you if you wish to continue.

I say the macro language used is "plain" language because words such as "transmit" and "receive" are used to cause just those functions. I just realized as I was writing this that you will need to find a list of the commands to put in the macros. Go to the Zakanaka help file and click the Find tab and type in "macro" and you will find several pages of info on customizing your macros including instructions to make "hotkeys" for direct keyboard control of often used functions. I like hotkeys because I don't have to reach for a mouse each time I want to invoke a macro or other control. Lots of options for you to play with.

One other item while I am thinking macros — The 36 macro buttons are related to the function keys in this manner. The top row can be activated simply by striking the function key corresponding to the position of the macro. That is, for "CQ" striking the "F1" key will send that macro and so forth across the board.

The second row of macros requires the Alt key plus the appropriate function key using the same order from left to right. The bottom row uses the Ctrl key plus the function key. This means you will have virtual hotkeys available as soon as you define your personal macros and get used to where they are located. Hint — try to have the same function key send the same macro you are used to from a previous program — saves some embarrassing moments.

There is one other little goodie that will please some of you. Logger will control your KAM or PK232 TNC like a champ. It takes a little patience but all the pieces are in place with instructions to get either one of these TNCs working. I am sure the original need was to communicate with the packet DX cluster. However, if you want to use Pactor or whatever other mode from your TNC you can do it.

I ran into one small trick that had me wondering for a minute during the PK-232MBX setup. The program said it could not open the serial port where the 232 cable was connected. It took a bit to realize that Logger was already using that port to communicate with the Icom rig. Changing that port configuration temporarily solved the problem and wonders could begin.

Although I did not follow through and make the connection to the rig, the impressive part is how well the program communicates with the TNC. This panel, incidentally is available when you click the "Data" button in the Logger program. See the screenshot.

Here again is another set of macros to define and redefine. The supplied macros are okay but you will need to personalize them to your call and QTH and other data. This group of 36 macros does not lend itself to function key operation but I found a hint in the definition of the "Cmd:" button. If you put an ampersand in when you name the key, you can hit Ctrl + the first letter on the key and then hit the Enter key and it is a kind of two-step hotkey that allows you to keep your fingers where they belong.

As well as this program worked, I still had a few features I could not explore which I blame on this operating system. One of them is the auxiliary screens. There are two of these and they allow you to monitor a second and third PSK signal along with the one you are working with on the main receive screen. Also, I did not find the familiar MMTTY scope.

I keep giving this ME a bad rap, and even though it deserves it, there are some advantages such as stability. Since the time several months back when I disabled the sleep-mode, I would guess there have not been more than five real system lock-ups when it became necessary to shut the power off and reboot.

So, if you are stuck with the ME system and you have software running in it that fits your needs, it will probably just plug along, do the job and you will be a happy camper. Very likely, if I had this in an office/game/entertainment environment for which most home computers are used, I would not have complaints. About the nicest statement I can make, but that is at least one positive vote from your village curmudgeon.

That is about it for this month. There is more happening I am sure. The propagation to the inner recesses of the mind seems to be fading so I will try it again next month. If you would like to ask questions about these subjects, feel free to E-mail me at [KB7NO@worldnet.att.net]. 73 until next time, Jack KB7NO. 73

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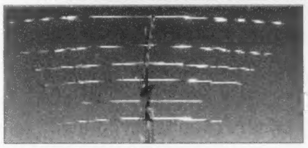

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Your Own Owner's Manual

Are you recording project accomplishments in a logical fashion for future reference?

Your latest project has been completed, and all the planning, painting, and soldering were well worth it. The newest addition to your Homebrew Ham Shack takes its place for all to see. I can see you beaming with pride, even from over here!

But, you know what ? You aren't finished with the project — not just yet!

When was the last time, when purchasing anything of an equipment nature, you weren't given a pamphlet explaining all about the "widget" just purchased? I'll bet you've gotten an "Owners Manual" with just about everything of value for as long as you can remember. They do come in handy from time to time, like when you need replacement parts and such.

So why not create one for your latest endeavor ! No, I don't expect that you would rival Homer's *Iliad,* but a binder containing the important documents, etc., from which the project evolved is a valuable asset.

Let me explain how I preserve the items relating to my endeavors, and what the benefits are from doing this.

When considering a project for construction, I gather the necessary schematics and written articles at my desk. I then photocopy the schematic, ENLARGED, for my use during construction and place the original in a three-ring binder for safekeeping. The written article joins the schematic also at this time. There's a pocket on the inside cover of the three-ring binder for holding the magazine presently being utilized.

My reasons for doing this are:

1. I am going to "misplace" the schematic and will have to make a second copy to continue building. This is the unwritten #1 law of building at my bench.

2. Drawings of electronic circuits develop a "charge" from the positive and negative circuits on the page, thereby attracting coffee, soda, and other beverages, covering the circuits and rendering the page useless. This is a little known fact of schematicology, but requires yet another copy of the original to be created.

3. The art of using red pencil to identify connections completed and components installed sometimes renders the schematic illegible. Yet another copy would prove to be a bonus.

4. Magazines are shy creatures, evading the sharpest of eyes when being hunted. Better to confine the desired edition before it decides to hide amongst the sofa cushions. This is also a healthy approach to homebrewing, in that it (a) keeps your blood pressure down, inasmuch as you know that the original is right where you left it and, (b) allows you to refrain from shouting, "Where's my copy of *73*?" all the time, thereby avoiding a sore throat, etc.

So now the project has been decided upon and is underway. Parts are either gathered from supplies you already have, or are placed on order.

Place a copy of the order document in the binder also. I have often thought that I ordered a specific part, when in fact I hadn't. Keeping a copy of the "shopping list" enables you to know exactly what you requested, how many, how much, and when it should arrive. Six months from now, I doubt you will remember accurately all of the facts surrounding the purchase.

I sense that you disagree with me, and that your memory is unequaled! OK, to disagree is good — but I can prove my point of view!

Answer the following question, please:

What is the part number and catalog number, cost, and page number from the catalog, of the last electronic part you purchased by mail? From which company? What is their toll-free ordering number?

Can't remember, huh?! Guess a copy of the order would be a good thing to put in the folder should you need parts later on. It saves a lot of time not having to do the research all over again.

As the project progresses, you'll find that changes to the parts are sometimes necessary, either to accommodate a different frequency range, to include another added circuit, etc. Include a page in the binder for "as built" notes. The changes entered, along with any needed formula data, can prove invaluable for future reference. Difficulties encountered and the remedy are useful.

On one page I always describe the finish used on the cabinet and/or chassis. Sounds somewhat trite, but I have found it to be one of the most beneficial items in the folder. The reasons for this are because of the variations between manufacturers and types of primer and paint used, and their names and colors. There can also be a huge difference, depending on which manufacturer you use, between the types of clear spray used to protectively coat the finished panel and its lettering. Not all paints from one manufacturer will accept the clear protective coating of another. The products can interact, making a perfect front panel into a metal plate covered with a soggy, sticky mess. Then you not only get to clean the mess, but you get to repaint and letter the panel again. By logging the primer and color, I can match the color scheme *exactly* when I decide to build the matching power supply and speaker at some later date. Black from the XYZ company isn't exactly like black from the ABC company.

Now your project is complete! You can add any information you desire to Your Own Owner's Manual.

Something nice I've seen are pictures taken during the construction phase. Digital cameras are very useful for this. The pictures can be printed on regular paper and stored in the binder as a "historical document." Visitors to the shack will undoubtedly be impressed by your finished work, and the Owner's Manual allows them to appreciate your efforts during construction.

WARNING! This manual does have the capability of becoming reproductive. One project leads to another, and to another, etc., etc. Plan for future endeavors by leaving enough room in the binder for the next construction item. Dividing the binder into sections, e.g., Receivers, Transceivers, Transmitters, Power Supplies, as your building adventures continue, is a good idea. The binder becomes a history of your building efforts.

Once again, congratulations on your accomplishment!

Weather Sat Tracking is Awesome!

continued from page 15

NASA engineers settling some technical point over a cup of coffee.

On the downside however, a number of parents, for some reason, just don't seem to "get it." I believe that perhaps too many of today's activities — such as this project — are just put in a mental overload garbage pile with all the Internet, computer games, and other things of mystery, with no actual effort to try to understand. The concept that there is no "magical" Internet connection and an antenna pointing at the sky seem to be meaningless. A demo was put on at one school open day with only minor interest from the visiting parents, although the roaming kids wouldn't stay away. One parent was even worried that we wouldn't be able to see the satellite through the overcast! There must be a message there somewhere.

All in all, it has been a wonderful experience for me. I started out not knowing what would be possible with the first group of Year 6 students around 11 or 12 years old, but the last group was the youngest yet, a combined class of Year 3/4 at 8 or 9 years old. The photos are of this younger group and are from Glenorie Public School here north of Sydney.

Although this project was not directly linked to amateur radio, there were plenty of opportunities to explain the hobby. I usually have a handheld with me, and after answering the usual question, "What kind of CB is that?", the door is open to talk about why amateur radio is different. I guarantee that any amateur will find volunteer technical projects such as this a lot more satisfying than any paid job. Primary school students need ham volunteers with their practical, hands-on way of making high-tech things happen. My very first class will be of university age next year. I wonder if our earlier projects will have any impact on their future …

Direct-Mount "J" Antenna for 440 MHz HTs

continued from page 23

rotating collar, and you probably will need to cement the two together. E-6000 clear adhesive works fine. This antenna is not difficult to build, but it does require care and neatness in construction. To duplicate the antenna, just be sure you do in fact do a duplicate and don't deviate. For example, on the coax assembly, don't substitute a different kind or type of coax or alter the specified dimensions.

In doing your final trimming, you will find that the length of the matching section has a greater effect on the resonant frequency of the system than does the length of the radiating element. Plug a small UHF SWR meter (such as Radio Shack #940-0866) directly into the transceiver antenna socket. Plug the antenna PL-259 into the SWR meter without any intervening coax, and use the fewest adapters possible. Obviously, the antenna should be inside the PVC housing while making SWR meter readings.

I have built more than a dozen of these antennas, and an SWR of 1.2:1 or less across the voice-repeater band from 442 to 450 MHz is typical. Outside the band the SWR rises rather rapidly, reaching 1.5:1 at about 439 MHz and 453 MHz.

LOPs to Think About

continued from page 34

that provided great satisfaction upon completion. After completing this project I was thinking how it might be of use to the computer hams of today.

Continued on page 58

LOPs to Think About

continued from page 57

Currently I have a computer monitor sitting next to the radio with the mouse next to the CW key. With the mill removed the keyboard will fit across the opening and sit on the linoleum desktops. The slide-out shelf below the keyboard makes a good place for the log or note-taking. The naval engineers of 50 years ago didn't know about computers, but it works.

In the July 2001 *QST*, page 119, there is another call for one of these tables, and other USN equipment, by the crew restoring LST-325. I hope they get the overwhelming response that I received. I must say thank-you to all of you for offering great stories, pictures, and especially you two who donated the equipment. You all know who you are.

Does this desk get any use? You bet! Most recently it was used for Straight Key Night 2001. It sees regular service around the HF QRP frequencies, too.

QRP Internet Computing

continued from page 37

baud modem can put on the screen. Shell account access with a 33.6kbs modem is awesome.

A LINUX shell account allows you to FTP, Telnet, and — if you wish to learn a few more LINUX commands — get into the hidden byways of the Internet easier than with most popular graphical browsers at national ISPs. You can even teach yourself LINUX from the comfort of your old DOS computer.

E-mail, and reading the Internet's amateur radio USENET newsgroups, is simple because LINUX comes configured with PINE, an easy-to-use program that does both. At the LINUX prompt, type "pine" and you're on your way with the help of a clear menu.

LYNX is the LINUX text browser that provides powerful hypertext linking on the World Wide Web. Typing "lynx" starts the browser with its status bar menu. It just takes a couple of keystrokes and a few seconds to fill your screen with the Web page you were seeking. LINUX is case-sensitive and most commands use lower case.

The communications program to dial into a shell account must support "VT-100" terminal emulation, and should support Z-Modem, the preferred file transfer protocol. PINE and LYNX need VT-100 to display correctly. Vintage DOS communications programs like Hayes Smartcom, Procomm Plus, COMIT for DOS, and many others offer VT-100 screen emulation and the Z-Modem protocol.

Most Web sites are thoughtfully designed to identify on-line graphic files with the .gif, .jpg, and .bmp extensions. If you want one of them, highlight it with the LYNX cursor and press "d" to start a download to the server. From there, download it to your own computer, where you can open the file with your favorite graphic file viewer.

Once you know how to use a dial-up LINUX shell account, you are virtually independent of computer platforms to access your files, E-mail, and the Internet, whether locally or traveling. You can use any computer with a modem to dial into your ISP.

For unlimited use, the monthly cost of most LINUX shell accounts is about half that of national graphical Internet access charges. ISPs assume: (1) you must be a savvy user to ask for a shell account; (2) therefore they know they won't need to provide you much support; and (3) narrow bandwidth shell accounts demand less resources from their servers compared to a regular account.

There are even "free-nets" still around, that provide dial-in shell accounts as a public service. Colorado has one of the oldest and best, with information about it at [www.nyx.net].

It's time to rethink the notion of computer "obsolescence." It's estimated there are over 250,000,000 pre-Pentium DOS computers in the world, and the ham community surely has its share. None of them needs to be idle or discarded. Their efficient operating systems and programs can easily handle the bulk of the amateur radio community's routine Internet information tasks.

Bill Boas KC0IZI *is a writer who first went on-line in 1986.*

QRP

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It turned out that the coax was from Radio Shack and the RG-58 cable has a solid center conductor. Guess it took one too many bends to break the center conductor in half. I would suggest you check your jumpers and replace any of those made up of Radio Shack RG-58 cable.

Radio Shack does sell RG-8U cable and the so-called mini 8 cable. Both of these have a stranded center conductor that won't fail if it is flexed too much.

The second edition of the *HW-8 Handbook*

Still looking for mods for the HW-7, HW-8, and HW-9 QRP transceivers. They will be in the second edition of the *HW-8 Handbook*. The mods can be as simple as a value change for a part, to a complete reworking of a circuit.

I am hoping for a Dayton 2002 Hamvention release for the book. Inside you will find PC board layouts, assembly diagrams, and, of course, modifications to these radios. This time, too, the book will be full of photographs and drawings. Again, I am hoping for a Dayton 2002 release date.

QRP AM on the 10-meter band

With the solar flux being somewhat unpredictable, we have had some really strange band openings. One of those has been on the 10-meter band. Now, if you have used this band before, you know it does not take a lot of power to communicate halfway around the planet on just a few watts. This is the case on the AM phone portion of the band as well.

I've been having a ball on 10-meter AM phone using an old Heathkit MT-1 (the Cheyenne) transmitter. The place to be is 29.000 MHz, the AM calling frequency. I use the MR-1 (the Comanche) as the matching receiver. The pair looks good and performs like gangbusters!

When 10 is open, then FM is up the band a bit. My Ten-Tec Argonaut II will transmit on FM. It's really too bad that the Argonaut II won't transmit on AM! I've worked up and down the West Coast from my location in Ohio with nothing more than five watts into a Gap Titan vertical antenna. I've even been able to kerchunk some of the repeaters that populate the 10-meter band.

Ten meters is a strange band. One moment it's open worldwide, and then nothing. The key to working ten meters is to keep checking the band. With today's broadbanded radios, checking the band for activity is as simple as punching up a memory! Keep an ear open for me. I'll be on 29.000 listening for AM stations.

Next time we meet, I will try to present the Ten-Tec "Power Mite" QRP rigs. These little guys started a company that is still around today.

HOMING IN

continued from page 47

4). I get to choose which submission is best, of course, and if more than one person sends in that idea, the first one received earns the book.

By the way, my book has complete construction plans for the Roanoke Doppler set. An improved antenna switcher for it is fully described at the "Homing In" Web site. This combination is ideal for mobile RDF on FRS frequencies with your scanner.

I'm waiting to hear from you, so send in your suggestions for RDF with FRS radios, along with local hunt reports, RDF-related photos, and news. E-mail is best, but postal mail is fine, too. Addresses are at the beginning of this article. Happy hunting!

ON THE GO

continued from page 50

Service (MARS), Civil Air Patrol (CAP), and such. Since these are directly affiliated with the military, there may be a greater comfort level in turning to known and trained operators rather than well-meaning strangers. If you've considered joining MARS but haven't gotten around to it, now might be a good time.

Over the next few months, I'll be writing about several products that may well lend themselves to situations such as those we may be facing in the future. In the meantime, if you have any lessons learned from the September 11th attack, or other disaster service support, please drop me an E-mail. We need to make sure we're as prepared for the challenges of the 21st century as we were throughout the last one. It's important that we share our experiences.

Be sure to tell our advertisers that you saw their ad in *73!*

NEVER SAY DIE

continued from page 8

benefit from the reality of college, maybe you can help steer your children or grandchildren out of a lifetime commuting to a job in business or government.

INC magazine published a survey of the top 100 entrepreneurs. Only a few were college grads. The rest either skipped college (like Steve Jobs) or dropped out — as did Bill Gates. If Bill hadn't dropped out of Harvard when he did, he would have missed the gravy train. Even one year later would have been too late. No hundred billion. And I'll bet his dad was furious with him for doing something so stupid.

A note and clipping from Roy Prince AB6ND about a college education advises that "young people should avoid the ritual grind on university courses which can be irrelevant, badly focused, or simply pointless, being taught by lecturers who have no practical knowledge of the careers for which they are supposed to be preparing their students."

C. Northcote Parkinson had very similar advice in his wonderfully written *Parkinson's Law*. If you haven't read Parkinson, for heaven's sake hie down to a library and rectify this huge gap in your education.

My rule of thumb is simple: If a company is interested in your college credentials when you apply for work, this is not a place you want to waste your time working.

Super Kids

When I was a kid, my mother read to me while I was eating my lunch, which probably has something to do with thousands of books I've read since then.

WWII broke the barrier. Before that most women had kids and stayed at home to raise them. When all the men were drafted to go out to kill and be killed, the women moved in to keep the "home front" businesses going. They've never moved out. By 1975, 44% of mothers were working outside the home. That's up to 64% now, with day care centers doing what little child raising that's being done. Now there's a fuss because almost 20% of day care babies have overly aggressive behavior by the time they graduate to kindergarten.

My mother had one room for her studio, where she painted portraits and magazine cover art (this was before color photography had been invented), so she was around the house most of the time. With today's computer and communications systems, more and more women will be able to telecommute, and thus be able to give their babies more attention.

I'd be more in favor of day care centers if more of them would provide the stimuli babies need to help develop their brains — and I don't mean being hypnotized into docility by hundreds of hours of Sesame Street. I review several outstanding books on the subject in my *Secret Guide to Wisdom* — like Joan Beck's $7 *How to Raise an Outstanding Child*.

One of the big downsides of two-worker families is that the resulting higher family incomes have raised the prices of everything. Prices will always be determined by what people are willing to

Continued on page 61

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After continuously being turned on for 14 days (336 hours), it was possible to read a newspaper using only the output from this amazing system. This item sold out at Dayton!

Jim Gray II
210 East Chateau Cir.
Payson AZ 85541
[akdhc2pilot@yahoo.com]

"Solid"

This should be a solid month for DXers, with Fair (F) or better conditions prevailing about sixty percent of the time. Although MUFs will often rise above 30 MHz, there will be some great opportunities on all bands, including 80 and 160 meters.

The best conditions are forecast to occur during the final week of February, but most of the month ought to seem pretty good when compared to the same period last year. Solar flux is again expected to remain very high throughout the month, so look for rapid recovery from ionospheric disturbances when they occur. I've forecast the most intense solar activity for the 4th, 11th, 16th, and 25th, but only moderate geomagnetic effects should result.

To get a short-range idea of what propagation conditions are going to be like, I usually check the Report of Solar & Geophysical Activity found on the Space Environment Center's Radio User's Page [www.sec.noaa.gov/radio]. Their data usually includes the 10.7cm flux and geomagnetic-A values. When the flux index is forecast to be high (above 150) and the geomagnetic index is expected to be low (below 3), good propagation will generally result. Conversely, when the flux value is low (below 90) and the geomagnetic value is high (above 3) then poor conditions will usually prevail.

For lots of other interesting and useful data, visit the IPS Radio and Spaces Services support page for North America at [www.ips.au/asfc/usa_hf/].

Until next time, 73 and happy DXing!

Band by Band Summary

10/12 meters

These bands should be pretty active this month. As always, openings start in the east at sunrise and follow the sun westward, closing in Asia by sundown. No openings are expected at night, and daytime performance will begin to deteriorate somewhat toward the end of the month. Short-skip will usually range from 1,000 to 2,500 miles.

February 2002

SUN	MON	TUE	WED	THU	FRI	SAT
					1 F-G	**2** F-G
3 F-P	**4** P	**5** F-P	**6** F-P	**7** F-G	**8** G	**9** G
10 F-G	**11** F-P	**12** P	**13** F-G	**14** F-G	**15** F-P	**16** F-P
17 F	**18** F-G	**19** F-P	**20** F	**21** F-G	**22** G	**23** G
24 F-G	**25** P	**26** F-P	**27** F-G	**28** G		

EASTERN UNITED STATES TO:

GMT:	00	02	04	06	08	10	12	14	16	18	20	22
Central America	15 (40)	20 (40)	20 (40)	(40)	(40)	(20-40)	(15) 20	10-20	10 (20)	10-17	10 (20)	(10) 20
South America	**(15) 20**	**20 (40)**	**20 (40)**	**20 (40)**	**x**	**x**	**(15-20)**	**x**	**(10)**	**10 (15)**	**10 (20)**	**(10) 20**
Western Europe	40	40	40	40	(40)	x	(10-20)	10 (20)	(10) 20	(15-20)	(20)	(20-40)
Southern Africa	**(20-40)**	**(40)**	**x**	**x**	**x**	**x**	**x**	**(10-12)**	**10 (17)**	**(12) 17**	**(15-20)**	**20**
Eastern Europe	(40)	(40)	x	x	(20)	x	(10-20)	(10) 20	(20)	x	x	x
Middle East	**(40)**	**(40)**	**x**	**x**	**x**	**x**	**(10)**	**(10-15)**	**15 (20)**	**20**	**(20)**	**(20)**
India/ Pakistan	x	x	x	x	x	x	x	(15-20)	x	x	x	(20)
Far East/ Japan	**(15) 20**	**20**	**(20)**	**(20)**	**x**	**x**	**(20)**	**x**	**x**	**x**	**x**	**(10-20)**
Southeast Asia	(15-20)	x	x	x	x	x	x	(10-20)	(10-15)	x	x	x
Australia	**(10-17)**	**(15-20)**	**x**	**x**	**(20)**	**(30-40)**	**(20-40)**	**(10) 20**	**(10-20)**	**x**	**(20)**	**(10-15)**
Alaska	15-17	20-30	x	x	x	20-30	20-30	15-17	15-17	x	x	15-17
Hawaii	**(10) 15**	**(20)**	**20**	**(20)**	**20 (40)**	**40**	**(20-40)**	**(20)**	**(15-20)**	**x**	**(10)**	**10 (15)**
Western USA	(10) 40	(15) 40	20-40	(20) 40	40	40	40	(20-40)	(10-20)	10-20	10-20	10-20
CENTRAL UNITED STATES TO:												
Central America	**(15) 20**	**20 (40)**	**(20) 40**	**(20) 40**	**(20) 40**	**40**	**(40)**	**(10) 20**	**10-20**	**10-15**	**10 (20)**	**15-20**
South America	(15) 20	20	20 (40)	20 (40)	(20)	x	x	x	(10)	10	10(20)	(10) 20
Western Europe	**(40)**	**40**	**40**	**(40)**	**x**	**x**	**(20)**	**(15) 20**	**(10) 15**	**(15) 20**	**(20)**	**x**
Southern Africa	20	(20)	x	x	x	x	x	x	(10-15)	(10) 15	15 (20)	20
Eastern Europe	**x**	**(40)**	**x**	**x**	**x**	**x**	**x**	**(10) 20**	**(10-20)**	**x**	**x**	**x**
Middle East	x	(40)	(20)	(20)	x	x	x	(10-15)	(10-15)	(20)	20	(20)
India/ Pakistan	**x**	**(15)**	**x**	**x**	**x**	**x**	**(20)**	**x**	**(15)**	**x**	**x**	**x**
Far East/ Japan	x	x	(20)	20	(20-40)	(40)	(20)	20	(15-20)	x	15	(15)
Southeast Asia	**x**	**x**	**x**	**x**	**(20)**	**(20)**	**20**	**(15-20)**	**(15)**	**x**	**(15)**	**x**
Australia	(10) 15	15	(15-20)	20	20 (40)	20-40	20 (40)	(20)	x	x	x	(10-15)
Alaska	**15-17**	**15-17**	**x**	**x**	**x**	**(40)**	**(40)**	**20**	**20**	**x**	**x**	**x**
Hawaii	(10) 15	(15-20)	20	20	(40)	(20-40)	20 (40)	x	(15)	(15)	(15)	(10) 15
WESTERN UNITED STATES TO:												
Central America	**(20-40)**	**40**	**40**	**40**	**(40)**	**x**	**(20)**	**(10) 20**	**10 (20)**	**10 (20)**	**(10) 20**	**(15) 20**
South America	17 (40)	(20)	x	x	x	x	x	(15)	12 (20)	10-20	10-20	12 (40)
Western Europe	**x**	**x**	**(40)**	**(20)**	**(20)**	**x**	**(20)**	**(10-20)**	**(10) 20**	**(20)**	**x**	**x**
Southern Africa	(20)	x	x	x	x	x	x	x	(10)	(15)	15 (20)	(15) 20
Eastern Europe	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**
Middle East	(20)	(40)	(20)	20	20	(20)	x	(15)	(10) 15	(10-15)	(20)	(20)
India/ Pakistan	**(15-20)**	**x**	**x**	**x**	**x**	**x**	**x**	**(20)**	**x**	**x**	**x**	**x**
Far East/ Japan	(10) 20	(15-20)	x	x	(40)	40	(40)	x	x	x	(10-20)	10-20
Southeast Asia	**(15)**	**(20)**	**x**	**x**	**x**	**x**	**x**	**(20)**	**(15) 20**	**(20)**	**(10-15)**	**10-15**
Australia	(10-15)	(15-20)	x	x	x	(20-40)	(20-40)	20	(15-20)	15	(10-15)	10
Alaska	**10-15**	**x**	**x**	**20-30**	**20-30**	**20-30**	**20-40**	**x**	**20**	**15**	**x**	**15-17**
Hawaii	(15) 20	(15) 20	20	(20)	(40)	40	(20-40)	(15) 20	15 (20)	(10-15)	10 (15)	(10) 15
Eastern USA	**(10) 40**	**(15) 40**	**20-40**	**(20) 40**	**40**	**40**	**(20-40)**	**(10-20)**	**10-20**	**10-20**	**10-20**	**10-20**

Table 1. *Band, time, country chart. Plain numerals indicate bands which should be workable on Fair to Good (F-G) and Good (G) days. Numbers in parentheses indicate bands usually workable on Good (G) days only. Dual numbers indicate that the intervening bands should also be usable. When one number appears in parentheses, that end of the range will probably be open on Good (G) days only.*

15/17 meters

You'll find better daytime opportunities here than on 10 and 12 meters, especially into the southern hemisphere. Signals will peak toward the east before noon, to the south around midday, and to the west in the afternoon. Short-skip can be expected to be about 1,000 miles.

20 meters

Should continue to improve at night, and is the best overall band for daytime operation. Openings begin at sunrise and last well into the evening hours. Short-skip will average between 500 and 2,500 miles.

30/40 meters

Best between sunset and sunrise. Africa, the Middle East, and Asia should provide some good opportunities since atmospheric noise will generally be at very low levels. Short-skip will be under 1,000 miles during the day but beyond 700 miles at night.

80/160 meters

I expect these bands to yield some very good opportunities this month, especially when atmospheric static is low. Short-skip on 80 will be 2,000 miles or more, while skip on 160 should average only from 1,000 to 2,000 miles. These numbers, of course, apply only to nighttime operation.

NEVER SAY DIE

continued from page 59

pay for things, so this has fed inflation. Penny postcards are now 21¢. First-class mail has gone from 2¢ to 34¢, and nickel ice cream cones are now how much? Two bucks for a cone! That's crazy.

Until I get the time to finish my book on how any parents can raise their baby's IQs by 40 to 50 points, just by knowing what to do when, you'll have to make do with my source material — most of which is reviewed in my wisdom guide.

We are in desperate need of geniuses. Artists, composers, performers, writers, and in business. In politics? It'll never happen.

What to Write

Henry Hampel KA0TUP asked for someone to write an article about the Fists Club [www.fists.org], which has over 8,000 members. Any volunteers?

I'd like to see a whole lot more on PSK31, the 31-baud phase shift keying system. Get those word processors into action, please, and get me so excited I can't help but get involved.

More?

I was putting my editorial essays that couldn't fit into *73* on my Web site for a couple of weeks and then deleting them — until the November 2nd deluge of book orders. That stopped me for almost two months. Now I'm back in gear, so if you want more of my stuff you'll find more of it under "Wayne's Weird World" on [www.waynegreen.com].

Schools

In 1983, *A Nation at Risk* was published, warning that our school system was so poor that it was threatening the future of the country. In 1989, an educational summit set the goals to eliminate illiteracy and make American students No.1 in math and science.

Today, less than half of our 4th-, 8th-, and 12th-graders can read at grade level. For 4th-graders, it's 32%, with black students 12%. By the 12th grade, our kids score well below the teenagers in almost every other developed country in math and science tests.

The remedies suggested by the teacher unions are to pay teachers more and have smaller classes (thus more teachers). These sound good, but there are almost no examples of these moves increasing student test results.

Fortunately, technology will, I believe, come to our rescue.

If you're interested in coming up to speed, I recommend Lieberman's *The Teacher Unions — How They Sabotage Educational Reform and Why;* Encounter Books, ISBN 1-893554-21-X, 321pp., $17, Laissez Faire Books, 938 Howard Street, SF, CA 94103. Also from Laissez Faire: *The Homeschooling Revolution* by Isabel Lyman, Bench Press International, ISBN 0-9670430-6-9, 142 pp., $12.

The more you read about our school system, the more you're going to like my solution.

Distance Learning

For over 2,500 years, teachers and students have met face-to-face for discussion and lectures. Technology has been changing that.

First, it was books. These enable the best brains in the world to reach people anywhere. Technology has been steadily lowering the cost of books, enabling billions of people to share what only dozens could just a few generations ago.

Plus we now have radio, television (with a couple hundred satellite-induced channels), magazines, audio and video tapes, and (yes) the Internet. Ooops, I almost forgot what I consider the current major contender, DVD.

Kids no longer have to walk "three miles through the snow" to get to class. They're either home schooled, or a bus goes by their house and picks them up.

Until the Internet is wirelessly available via satellites (which will be coming soon), I see books and DVDs (digital video disks) as the knowledge delivery systems of choice.

Books and DVDs make it possible for people to learn when it's most convenient for them, not at the convenience of the teacher. For working people, this is usually nights and weekends — unless there's an "important" ball game.

With American colleges and universities already offering over 6,000 accredited courses on the Web, we'll be seeing this movement spreading worldwide as the Internet goes wireless, enabling people anywhere to participate.

Until the Web goes wireless, I see DVD as the media of choice. With professional actors as teachers, aided by state-of-the-art graphics and the ease of using stock film or setting scenes to demonstrate ideas, it's a very flexible and inexpensive media. We'll be seeing interactive lab experiments in every field of science. No more fire in the chemistry lab when you make a mistake — except on your DVD screen.

The inexpensive availability of education on any subject and in any language is a revolution on the order of the printing press. This enables people anywhere to rise from poverty and ignorance. It'll raise hell with the current political and religious systems, which rely on ignorance to control minds and countries.

The one thing that's been lacking so far has been some system of evaluating the worth of distance-learning products. I'm doing my best with my reviews of books I say you are crazy if you don't read. That's my $5 *Secret Guide to Wisdom.* But that needs to be expanded to embrace all distance-learning media and with input from millions of people, just as I did with my *CD Review* magazine.

I'd love to get such a publication started — first as a magazine — then as both a magazine and a Web resource. Twenty years ago, it cost about $500,000 to start a nationally distributed magazine. Now it's close to $1M. If you know anyone with an extra million to invest in changing the whole world, please advise.

Am I being extravagant? It cost me about $250,000 to start *Byte* in 1975, the first personal computer magazine, and look at the impact it's had!

Wireless

Nothing yet is what you've seen. Sure, 100 million Americans are slowly frying what little of their brains they have left after going to public school with cell phones, for which we hams can take full credit. We can proudly brag that we did that. We developed the cellular technology which Motorola and G.E. then built into a new industry — for Nokia.

Today, wireless networks are being built all around the world. Soon we'll have cell phones and Web connections via satellites accessible from anywhere. High speed wireless data connections to businesses and homes will replace fiber, cable, and wire. New cars will call for help when the air bag is deployed or someone tries to steal it. Heck, our Honda van has a global position system which tells us where we are and how to get anywhere we want to go — with a cheery Japanese-accented woman warning us before every route change.

While kids in Pakistan are out tending goats, our kids will be sitting in the back seat of our vans watching any of 200 or so video channels or enjoying their newest DVD-delivered educational programs. Or they may be talking with friends anywhere in the world via their pager-cell phones, complete with a video camera built-in.

Outing the Ineffable

When I wrote to Jim Lovelock, the author of *Gaia*, suggesting that the Earth itself might have a collective consciousness of all its inhabitants, just as each of us has a consciousness that's the sum of the consciousnesses of our cells, he wrote back that he preferred not to discuss the ineffable.

Ineffable = indescribable, undefinable.

Well, dammit, it's about time to take the wraps off the ineffable and make it effable.

But my big problem is getting across the concepts I have about all this, since we don't have words for them. Yet.

Now, what's ineffable? This is going to take a while, but everything I'm going to discuss is tied together. And all of them are choice targets for skeptics — skeptics who have not bothered to do their homework. Ignorant skeptics.

Psychic Communications

Can we really communicate with the departed? You bet your bippy we can. Hell's bells, psychics have been doing that for all of recorded history, and a long time before that. And yes, the validity of these communications have been confirmed endlessly.

Rather than me writing a book to prove this, I suggest you find a library with Mae Sewal's *Neither Dead Nor Sleeping*. I've reviewed this 1920 book in my *Secret Guide to Wisdom* (p. 14). My grandmother, several years after she died, guided my mother to this book when my mother asked one day, "Netta, are you trying to tell me something?"

Mae was a world-known speaker on women's rights, not a tea leaf reader. In her book, she describes how her recently departed husband contacted her and carried on a series of experiments from the other side. Fascinating book.

Konstantine Raudive (*Breakthrough!*) discovered that he could contact the other side using a tape recorder. There are groups in at least a dozen countries doing this. You can read my review of *Voices From The Tapes* on page 25 of my *Wisdom Guide* to find out how you can do this, too. On page 19, I review Dr. Pat Kubris and Mark Macy's *Conversations Beyond the Light*, where their Timestream Laboratory has made contact with Edison, Einstein, Madam Curie, Werner Von Braun, and even Paracelsus. Heck, they even got a computer-printed photo of Paracelsus.

To learn more about the reality of the so-called spirit works, read books by Moody, Monroe, Montgomery, Brinkley, and others. It's all very well documented.

The spirit world does not experience time as we do, so there's no problem with contacting anyone out of the past.

Dowsing

Yes, dowsing is real. No, scientists haven't a clue as to why or how. And, yes, I'll tie all this together eventually. Don't be so impatient. It's tough dealing with the ineffable.

The big problem is that you haven't been reading the books I've reviewed in my *Secret Guide to Wisdom*. It's the leading a horse to water, but not getting him to drink syndrome.

Step one is to read Chris Bird's *The Secret Life of Plants*. This will show you that plants are in tune with us on some level. They can in some way sense our thoughts.

The next step is to read *The Secret Life of Your Cells*. This shows that every cell in our body, even if separated by thousands of miles, is still in instant communication with every other cell.

Then you should read J. Allen Boone's *Kinship With All Life*, which explains how you can communicate with any living thing — even a fly.

One more homework book is Rupert Sheldrake's *The Presence of the Past*, his introduction to morphic resonance.

Now you're ready for Dean Radin's *The Conscious Universe*, wherein he shows that precognition, telepathy, and psychokinesis have all been thoroughly proven by scientists to be real phenomena, no matter how much the pathological skeptics complain.

After this inculcation into the world of the weird, you'll be in a position to grasp the concept of a sum of all consciousnesses. I call this Sigma, just to have a word for it. Sigma can create universes. Scientists have marveled that the physical constants are such that if any of them were different by even the slightest there would be no universe.

Sir Fred Hoyle, the astronomer, in his *Evolution From Space* (p. 11 in my *Wisdom* book), likened the accidental construction of the DNA molecule to the liklihood of a tornado blowing through a junkyard and constructing a 747. It didn't happen by accident.

This is the power that we tap into when we wish or pray for something. Art Bell fans will remember when he had his listeners pray for rain in Texas and Florida, and both states were flooded within hours.

In my *Wisdom Guide* I review the book by Maurey, *The Power of Thought*, and Scott Adams *The Dilbert Future*. Both books explain how you can make things happen by wishing for them.

Since coming to understand how these things work I'm very alert to serendipity. When opportunity knocks I'm right there at the door, Welcome mat out. And it sure pays off.

So, yes, dowsing works. It's been proven endlessly. The best book on the subject is Chris Bird's *The Divining Hand*. Radionics and psychometry also are real. Read William Bennett's *How to Communicate With Plants and Animals*.

How can dowsers find anything and anyone by dowsing a map? Because everything and everybody are all connected on a nonphysical level.

Scientists, instead of shoveling all the psychic data under their enormously bumpy rug, need to take off their blinders and learn more about the metaphysical. I almost said world or universe. The metaphysical isn't physical, so these concepts don't apply. Let's call it Sigma. We honor God with a capital G. Perhaps we should spell it SIgma, with two capital letters. The Greek letter for it is Σ.

As we know from psychometry, even rocks have … well, it isn't consciousness … we don't even have a word for it. But we can contact even the "spirit" of a rock.

If we can break scientists loose from the physical, there's a whole new area for investigation. Quantum physics has lifted the carpet a bit. Or, perhaps, drawn back the curtain just a tad, which is separating the physical from the metaphysical.

Continued on page 64

Wise Up!

Here are some of my books which can change your life (if you'll let 'em). If the idea of being healthy, wealthy and wise interests you, start reading. Yes, you can be all that, but only when you know the secrets which I've spent a lifetime uncovering.

......`Wayne`

The Secret Guide to Health: Yes, there really is a secret to regaining your health and adding 30 to 60 years of healthy living to your life. The answer is simple, but it means making some serious lifestyle changes. Will you be skiing the slopes of Aspen with me when you're 90 or doddering around a nursing home? Or pushing up daisies? No, I'm not selling any health products, but I can help you cure yourself of cancer, heart trouble, or any other illness. Get this new, 2001 expanded edition (156p). $10 (#05)

The Secret Guide to Wealth: Just as with health, you'll find that you have been brainwashed by "the system" into a pattern of life that will keep you from ever making much money and having the freedom to travel and do what you want. I explain how anyone can get a dream job with no college, no résumé, and even without any experience. I explain how you can get someone to happily pay you to learn what you need to know to start your own business. $5 (#03)

The Secret Guide to Wisdom: This is a review of around a hundred books that will boggle your mind and help you change your life. No, I don't sell these books. They're on a wide range of subjects and will help to make you a very interesting person. Wait'll you see some of the gems you've missed reading. You'll have plenty of fascinating stuff to talk about on the air. $5 (#02)

The Bioelectrifier Handbook: This explains how to build or buy ($155) a little electrical gadget that can help clean your blood of any virus, microbe, parasite, fungus or yeast. The process was discovered by scientists at the Albert Einstein College of Medicine, quickly patented, and hushed up. It's curing AIDS, hepatitis C, and a bunch of other serious illnesses. It's working miracles! The circuit can be built for under $20 from the instructions in the book. $10 (#01)

My WWII Submarine Adventures: Yes, I spent from 1943-1945 on a submarine, right in the middle of the war with Japan. We almost got sunk several times, and twice I was in the right place at the right time to save the boat. What's it really like to be depth charged? And what's the daily life aboard a submarine like? How about the Amelia Earhart inside story? If you're near Mobile, please visit the Drum. $5 (#10)

Wayne's Caribbean Adventures: My super budget travel stories – where I visit the hams and scuba dive most of the islands of the Caribbean. You'll love the special Liat fare which let me visit 11 countries in 21 days, diving all but one of the islands, Guadeloupe, where the hams kept me too busy with parties. $5 (#12)

Cold Fusion Overview: This is both a brief history of cold fusion, which I predict will be one of the largest industries in the world in the 21st century, plus a simple explanation of how and why it works. This new field is going to generate a whole new bunch of billionaires, just as the personal computer industry did. $5 (#20)

Cold Fusion Journal: They laughed when I predicted the PC industry growth in 1975. PCs are now the third largest industry in the world. The cold fusion ground floor is still wide open, but then that might mean giving up watching ball games. Sample: $10 (#22)

Julian Schwinger: A Nobel laureate's talk about cold fusion—confirming its validity. $2 (#24)

Dowsing. Yes, dowsing really does work. I explain how and why it works, opening a huge new area for scientific research with profound effects for humanity. $2 (#84)

Improving State Government: Here are 24 ways that state governments can cut expenses enormously, while providing far better service. I explain how any government bureau or department can be gotten to cut it's expenses by at least 50% in three years and do it cooperatively and enthusiastically. I explain how, by applying a new technology, the state can make it possible to provide all needed services without having to levy *any* taxes at all! Read the book, run for your legislature, and let's get busy making this country work like its founders wanted it to. Don't leave this for "someone else" to do. $5 (#30)

Mankind's Extinction Predictions: If any one of the experts who have written books predicting a soon-to-come catastrophe which will virtually wipe most of us out are right, we're in trouble. I explain the various disaster scenarios, like Nostradamus, who says the poles will soon shift (as they have several times in the past), wiping out 97% of mankind. Okay, so he's made a long string of past lucky guesses. The worst part of these predictions is the accuracy record of some of the experts – like Hapgood, Einstein, Snow, Noone, Felix, Strieber. $5 (#31)

Moondoggle: After reading René's book, *NASA Mooned America*, I read everything I could find on our Moon landings. I watched the NASA videos, looked carefully at the photos, read the astronaut's biographies, and talked with readers who worked for NASA. This book cites 45 good reasons I believe the whole Apollo program had to have been faked. $5 (#32)

Classical Music Guide: A list of 100 CDs which will provide you with an outstanding collection of the finest classical music ever written. This is what you need to help you reduce stress. Classical music also raises youngster's IQs, helps plants grow faster, and will make you healthier. Just wait'll you hear some of Gotschalk's fabulous music! $5 (#33)

The Radar Coverup: Is police radar dangerous? Ross Adey K6UI, a world authority, confirms the dangers of radio and magnetic fields, including our HTs and cell phones. $3 (#34)

Three Gatto Talks: A prize-winning teacher explains what's wrong with American schools and why our kids are not being educated. Why are Swedish youngsters, who start school at 7 years of age, leaving our kids in the dust? Our kids are intentionally being dumbed down by our school system — the least effective and most expensive in the world. $5 (#35)

Aspartame: a.k.a. NutraSweet, the stuff in diet drinks, etc., can cause all kinds of serious health problems. Multiple sclerosis, for one. Read all about it, two pamphlets for a buck. (#38)

$1 Million Sales Video: The secret of how you can generate an extra million dollars in sales just by using PR. This will be one of the best investments you or your business will ever make. $40 (#52)

Reprints of My Editorials from *73*. Very few things in this world are as we've been taught, and as they appear. I blow the whistle on the scams around us, such as the health care, our school system,. our money, the drug war, a college education, sugar, the food giants, our unhealthy food, fluorides, EMFs, NutraSweet, etc.

1996 Editorials: 120 pages, 100 choice editorials. $10 (#72)

1997 Editorials: 148 fun-packed pages. 216 editorials. $10 (#74)

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1999 Editorials: 132 pages of ideas, book reviews, health, education, and anything else I think you ought to know about. $10 (#76)

2000 Editorials: 76 pages (thinner magazine as a result of our slowly dying hobby) $5 (#77)

Silver Wire: With two 5-in. pieces of heavy pure silver wire + three 9V batteries you can make a thousand dollars worth of silver colloid. What do you do with it? It does what the antibiotics do, but germs can't adapt to it. Use it to get rid of germs on food, for skin fungus, warts, and even to drink. Read some books on the uses of silver colloid, it's like magic. $15 (#80)

Silver Colloid Reprint. April 97 article on a silver colloid maker, history, and how to use the stuff. $5 (#98).

Colloid Kit. Three 9V battery clips, 2 aligator clips & instructions. $5 (#99).

Wayne's Bell Saver Kit. The cable and instructions enabling you to inexpensively tape Art Bell W6OBB's nightly 5-hr radio talk show. $5 (#83)

73 Writer's Guide: It's easy, fun, can pad your résumé, and impress the hell out of your friends. $0 (#78)

Cold Fusion Six-Pack: Six Cold Fusion Journal back issues to bring you up to speed. $20 (#19)

NASA Mooned America: René makes an air-tight case that NASA faked the Moon landings. This book will convince even you. $30 (#90)

Last Skeptic of Science: This is René's book where he debunks a bunch of accepted scientific beliefs – such as the ice ages, the Earth being a magnet, the Moon causing the tides, etc. $30 (#91)

Dark Moon: 568 pages of carefully researched proof that the Apollo Moon landings were a hoax—a capping blow for René's skeptics. $35 (#92)

Dark Moon Video: 222-minute exposé nailing NASA with their own photos. If you've watched the NASA films of the astronauts walking on the Moon you wondered at their weird gait. Wait'll you see it speeded up. It looks exactly like they're running on Earth! They catch NASA in dozens of giveaways that the photos and films had to have been faked. $46 (#93)

IX

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NEVER SAY DIE

continued from page 62

A hundred years ago Theosophists Bessant and Leadbeater used meditation as a microscope to see the makeup of atoms. They described what we now call quarks and subquarks in their book, *Occult Chemistry*. You can read about their amazing work in Stephen Phillips' *Extra-Sensory Perception of Quarks* (p. 10 in my *Wisdom* guide).

If scientists weren't so blind to these things, they could use this same tool as a telescope which would make the Hubble look like a toy.

Alas, poor old Lovelock is so frightened of what the reaction would be from the scientific world that he is unable to start effablizing the ineffable. But he sure opened the door with his Gaia concept of the world acting as a living thing. Dunno why not, since each of our cells demonstrably has an awareness of what's going on around it. The total of our cells has an awareness. So why shouldn't the total consciousness of everything that makes up the Earth have an awareness?

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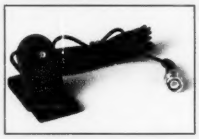

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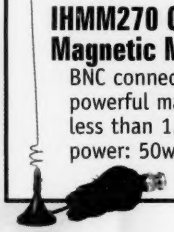

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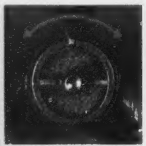

VSPC (Variable Side Pressure Control)

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MARK-V FT-1000MP, FT-1000MP, FT-1000/-1000D*, FT-990*, FT-920, FT-900, FT-847, FT-840*, FT-817

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